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The American University in Cairo
School of Global Affairs and Public Policy

Road Safety Challenges in Egypt: A Discussion of Policy Alternatives

A Thesis Submitted to the
Public Policy and Administration Department
in partial fulfillment of the requirements for the degree of
Master of Public Policy

By

YASMINE ELMOGHAZI

Spring 2019

The American University in Cairo

School of Global Affairs and Public Policy
Department of Public Policy and Administration

Road Safety Challenges in Egypt: A Discussion of Policy Alternatives

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ABSTRACT

Road traffic injuries are a growing health epidemic with fatalities and injuries marking damaging emotional, social, and economic impacts on humans, countries and the world. In response, the United Nations proclaimed a decade of action for road safety (2011-2020) to call upon governments across the world to act towards reducing the number of the rising global road traffic fatalities and injuries. The UN introduced a conceptual framework consisting of five pillars **(1) road safety management; (2) safer roads and mobility; (3) safer vehicles; (4) safer road users; and (5) post-crash response**. Unfortunately, Egypt did not commit to the UN's resolution although the country faces a serious road safety problem. Very little research has been done on road safety in Egypt, and the country lacks a coherent road safety policy with a clear strategy, defined objectives and measurable targets. Moreover, this study found various discrepancies in Egypt's crash data upon examining different reports and publications. To understand the underlying issues of Egypt's poor road safety conditions, a key research question was examined: what are the road safety challenges in Egypt? The results show that Egypt faces deeply rooted problems when it comes to road safety management. For example, the country does not have enough police officers available to enforce the road traffic laws, nor does it have a proper automated system to address the shortage. In addition, the absence of a road safety lead agency with a legal mandate has resulted in the lack of accountability and disorganization of government stakeholders. The failure in the road safety management pillar has caused a domino effect in all the other four pillars. In regard to the safer roads and mobility pillar, the research provides documentations of how the roads are not designed to protect pedestrians and other vulnerable road users. It also shows how newly maintained and paved roads have been damaged only a few months later due to the lack of organization among governmental bodies. This results in high government waste of resources, and the lack of monitoring and evaluation has created an atmosphere for corruption. As for the safer vehicles pillar, vehicles safety standards in Egypt are almost non-existent. Most of the recent cars sold in the market are not equipped with basic safety features such as airbags and/or an Anti-lock Breaking System (ABS). The safer road users pillar also faces a lot of challenges in the presence of the poor law enforcement and the lack of awareness among road users. As for the post-crash response pillar the failures occur due to the limited geographical coverage of ambulances and the challenging access to trauma centers. The challenges in the system result in preventable road traffic deaths and avoidable injuries. Hence, based on the literature and the findings this research draws a set of recommendations focused on establishing a road safety lead agency with a legal mandate to address these challenges.

In memory of AUC Students

Ammar Tareq- 2010

Nour Anwar- 2017

In memory of Provost Medhat Haroun

“I will forever be grateful”

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A special acknowledgment goes to my thesis advisor Dr. Ghada Barsoum for always being there for me. Her endless support and motivation were incredible throughout the long journey of this research. She has always been a great support system to rely on in this research. Dr. Barsoum is a leading example of women supporting women in the research field. Words are not enough to describe how grateful I am to her

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LIST OF ACRONYMS

ABS- Antilock Break System

AUC- The American University in Cairo

CAPMAS- Central Agency for Population Mobilization and Statistics

DUI: Driving Under the Influence

ESC- Electronic Stability Control

GRSP- Global Road Safety Partnership

GSR- Global Status Report

MoI- Ministry of Interior

MoH- Ministry of Health

MoT- Ministry of Transportation

MP- Member of Parliament

WHO- World Health Organization

UN- United Nations

Chapter 1: INTRODUCTION

The world loses around 1.35 million people every year due to road traffic crashes. Additionally, up to 50 million people suffer from road crash injuries; some of which are long-term sustained disabilities. Road injuries are the number one cause of death among children and young people aged 5-29 years. Only 7% of the world's road deaths occur in high income countries, while low- and middle-income countries have 93% of the world's road deaths with 13% and 80% respectively. The highest recorded road fatalities occur specifically in the African region (WHO, 2018). Moreover, the World Health Organization (WHO) expects the death rates in these countries to rapidly increase unless new initiatives and increased efforts are introduced to solve the problem. In March 2010, in response to the global pandemic of road injuries, the United Nations (UN) proclaimed a decade of action for road safety over the period of 2011-2020, which aims at decreasing the global number of road fatalities by 50%. The program called upon the world's governments to integrate a proposed conceptual framework for road safety within their national road safety framework. The UN's framework consists of five road safety pillars, which are: (1) **road safety management**; (2) **safer roads and mobility**; (3) **safer vehicles**; (4) **safer road users**; and (5) **post-crash response** (WHO, 2014).

In 2010 Members of the UN Road Safety Collaboration formed a consortium to create a Road Safety Program, the RS10, with a donation from Bloomberg philanthropy to tackle road safety issues and reduce the high occurrence of road fatalities in 10 low- and middle- income countries. The 10 countries accounted for more than 600,000 road traffic deaths annually. Egypt was among the 10 countries which included China, Brazil, India, Cambodia, Russia, Kenya, Vietnam, Turkey, Mexico, and Egypt. Egypt came first with the highest road traffic deaths rate per 100,000 population among the 10 selected countries.

The recorded road traffic death rates were; Egypt 41.6; Brazil 18.3; Cambodia 12.1; China 16.5; India 16.8; Kenya 34.4; Mexico 20.7; Russia 25.2; Turkey 13.4; and Vietnam 16.1 respectively (WHO, 2012). However, in the years following the Egyptian revolution in January 25, 2011, the RS10 program did not continue in Egypt shortly after it started (Bloomberg Philanthropies, 2012, 2014). In the years that followed, no other coherent road safety program or a road safety policy has been introduced in Egypt to date.

1.1Background

Since 2011, Egypt's population has increased by nearly 20 million (World Bank, 2018), and the number of vehicles on the road has nearly doubled (CAPMAS, multiple years). Since 2014, the Egyptian government has been focused on increasing the country's road network, and Egypt's vision 2030 marks the country's road network expansion as a top priority (Ministry of Planning, Monitoring and Administrative Reform, 2018). Yet, there is no clear road safety program has been introduced to tackle the issues of road safety in Egypt since the incomplete RS10. Expanding the country's road network indeed yields economic benefits as it is marketed by the government; however, it is not directly proportional with making the country's roads safer. Road crashes in Egypt mainly happen due to a human error according to the annual publications of Egypt's national Central Agency for Mobilization and Statistics (CAPMAS, multiple years). A human error can occur due to one or several factors such as speeding, recklessness, breaking the law, driving under the influence of drugs or alcohol, and/or fatigue (Rechter et al., 2006). The safe system approach adopted by the United Nation's road safety framework considers the fallibility of human beings as part of their nature. Hence, several attributes beyond road expansions are considered to accommodate a human error without the loss of life (WHO, 2014).

This study uses the five pillars framework to find answers to its research question: What are the challenges of road safety in Egypt? Accordingly, another question is tackled as follows: What are the current road safety conditions in Egypt? These questions are answered in depth in the findings and discussion chapter with the final objective of drawing a conclusion and a set of recommendations to address the challenges. The structure of this research is as follows: Chapter 1, gives a brief introduction about road safety globally, and road safety in Egypt. Chapter 2 reviews the literature on road safety, which is quite sporadic in Egypt; hence, it mainly relies on international literature. Chapter 3 defines the conceptual framework of this study in further details which relies on the UN's 2010 resolution for a decade of action of road safety. Chapter 4 explains the methodology of this research which relies on the analysis of both quantitative and qualitative data through in-depth interview and the documentation of field observations. Chapter 5, road safety in Egypt: the data dilemma, shows the discrepancy in Egypt's crash data, and the uncommon data collection method of counting only those who die at the crash scene as road fatalities. Chapter 6, findings and discussion, explores the current conditions and identifies the challenges of road safety in Egypt. Finally, chapter 7 concludes this research and draws a set of recommendations for addressing the challenges of road safety in Egypt.

1.2 Research Limitations and Delimitations

Knowledge is infinite, hence, the information collected in this study will never cover all aspects of the current conditions of road safety in Egypt. The sample of the interviewees from which the qualitative data was collected remains limited compared to a population of a hundred million Egyptians. The photos and videos documented in the field observations did not geographically cover all of Egypt, they were focused in urban cities, and particularly the

city of New Cairo where the American University in Cairo is located. Hence more traffic conditions could have been discussed, especially in the undocumented rural areas of Egypt where 57% of the population exists (World Bank, 2018). However, the findings in this research can trigger a series of future research which can examine its findings further and in more depth. The structure of this research can also be applied in other low- and middle-income countries suffering from high numbers of road traffic fatalities and injuries. Especially in neighboring African countries, because the African continent has the highest recorded road fatalities.

Chapter 2: LITERATURE REVIEW

In this study, the literature review is divided into five sets. The first set of literature looks into the importance of road safety management in reducing road crashes. The second set of literature highlights the importance of safe roads and mobility in saving lives on the road and examines the significance of segregating vulnerable road users; moreover, it examines the importance of reducing traffic volume by encouraging safer modes of travel such as public transport in the overall process of safe road use. The third set explores the effects of raising awareness of safer road users in reducing road injuries. The fourth set examines the importance of safe vehicles in reducing the number road fatalities and injuries. Finally, the fifth set of literature explores the significance of post-crash response in saving lives and reducing injuries upon a crash.

2.1 Road Safety Management

Road Safety activities are multisectoral and intersectoral in which different authorities carry out different activities and have various responsibilities, some of which have to be interconnected. The sum of these activities contributes to the final outcomes of road safety. However, intersectoral activities are difficult to be carried out in a hierarchal government structure which exists in many countries (Muhlard, 2009). Hence, the UN and WHO stress on the importance of countries having a lead agency and a national road safety strategy with measurable targets to manage their road safety. The lead agency overlooks the different multisectoral and intersectoral activities to ensure the cooperation and alignment of all the involved stakeholders to fulfill a country's national road safety strategy. The Global Status Reports on Road Safety 2009, 2012, 2015, and 2018 discuss the importance of road safety management through establishing a lead agency – stand alone, or within a ministry, with

authority and financial resources to manage the activities of road safety. Ideally the lead agency has a legal mandate with funds allocated in the national budget in order to be able to develop and overlook the execution of a national road safety strategy. (WHO, 2009, 2012, 2015, 2018). Without a lead agency with adequate funding and technical resources coordinating the activities of road safety are more likely to fail (Bliss & Breen, 2013)

Under road safety management, speed control is one of the most crucial activities to be managed; since speeding is a key risk factor in road traffic injuries (WHO, 2004). Although the establishment of a speed management infrastructure and control require large financial resources, a study of the cost benefit analysis of speed cameras in the UK showed that their financial gains from avoided injuries are higher than their cost (Gains, John, & Stoker, 2005). In high-income countries, 30% of deaths on the road are a result of high-speed road traffic crashes, while in low- and middle-income countries speeding is the leading factor of 50 percent of all road traffic crashes (WHO, 2004). There are different types of speed enforcement such as; stationery enforcement which are at fixed stations and are visible to drivers and circulating enforcement which could be either visible to drivers or camouflaged. Both could be done either with deployed police officers equipped with speed monitoring devices, such as LIDAR guns, for detecting violators. Or the system can be automated with speed cameras capturing images of the license plates of the violator vehicles. In all cases the successful management of speed enforcement result in positive outcomes of road safety. For instance, tickets which are issued as a mean of financial punishment for speed violators result in lower speeds. There are studies with supporting evidence that tickets have a positive effect in reducing road injuries (Luca, 2015). Luca found that tickets lead to fewer motor vehicle accidents and have a larger impact in controlling speed during the nighttime especially. The study's overall outcome showed that tickets change the behavior of drivers towards speeding.

The literature on the causes of speeding is wide, but frequently pointed to two significant causes, the first is the social acceptability of speeding, and the second is driving under the influence of alcohol and/or drugs. A qualitative research carried out by (Blincoe, Jones, Sauerzapf, & Haynes 2006), examined the views of a sample of prosecuted speed offenders in the Norfolk County in England. Speeding was largely perceived as widespread and normal, and many of the drivers lacked the awareness between speed and collisions. Studies in Australia and New Zealand showed that altering the behavior of drivers towards speeding through road safety campaigns integrated with speed camera enforcement has reduced personal injury collisions by up to 32% and 14% in urban and rural areas respectively (Keall, Povey, & Frith, 2001). A study published by Bogstrand et al. (2015) examined the relationship between driving under the influence of alcohol or drugs, speeding and seatbelt use among fatally injured car drivers in Norway. The study explained that since 2005 all fatal road traffic crashes in Norway have been analyzed in-depth by a multidisciplinary investigation teams by the Norwegian Public Roads Administration (NPRA), and alcohol and/or drugs were found in the blood sample of 40% of the drivers involved in fatal car crashes, and among the impaired drivers 71.7% were speeding.

2.2 Safer Roads and Mobility

Human error accounts for some 90% of road crashes (Peden, 2004). An increase in speed is directly related to the likelihood of a crash occurrence and the severity of the crash. In case of vulnerable road users, a human error can occur if a driver and/or a pedestrian make a mistake. If a pedestrian is struck by a car travelling at 30 km/h they would have a 90% chance of survival, while if they are struck by a car travelling at 45km/h they would have less than a 50% chance of survival, and if they are struck at 80 km/h they almost have no chance of survival. A car travelling at 50 km/hr will on average drive 13 meters until it is able to stop, and a car travelling at 40 km/hr will stop at less than 8.5 meters (WHO, 2018). The higher the speed of a vehicle, the longer the distance it would travel before the driver can bring it to a stop. Hence laws of kinetic energy along with the human error factor should be considered when designing safe roads to avoid the occurrence of 90% of road crashes. Figure 1 (See Appendix A) show how the relationship between speed and probability of pedestrian fatalities is highly proportional. The higher the speed of the car, the higher the risk of pedestrian fatality.

Consequently, this set of literature benchmarks the world's renowned road safety approach, Sweden's Vision Zero's philosophy in which the road design can significantly reduce road fatalities and address the problem of the human error. Taking into consideration human fallibility a road safety philosophy, Vision Zero, was created in Sweden and passed in the form of a road safety bill by the Swedish parliament in 1997. The philosophy acknowledges that human beings make errors and therefore this must be taken into consideration when roads are designed to accommodate to possible human errors and in return protect lives and reduce injuries, ultimately reaching Zero fatalities (Tingvall & Haworth, 2000). Today, Vision Zero's philosophy became an international inspiration for many road safety policies across the world. In addition to being applied in its motherland Sweden, the global leader in road safety with the smallest number of fatalities, 2.8 per

100,000 population (WHO, 2018), the philosophy has been adopted by many countries and cities and developed and integrated within their national strategies including the UK, Canada, Australia, New Zealand, Norway. Moreover Vision Zero has been adopted by many cities in the US such as New York, Boston, Los Angeles, San Francisco, Columbia, Minneapolis, Austin, San Antonio, Chicago, Orlando, Denver, Portland, Seattle, and more (Vision Zero Network, 2018).

2.2.1 Vision Zero Explained

Vision Zero does not accept the traditional concepts of road safety; such as designing wide and straight roads to give room for evasive maneuvers or creating pedestrian crossings guarded by traffic lights to protect pedestrians where they can come in contact with vehicles driven by fallible human drivers travelling at speeds more than 30 km/h (Kim, Muennig, & Rosen, 2017). Breaking a speed limit is a possible occurrence, and such an error can easily cause death. Following Vision Zero's philosophy Swedish roads are designed in a forgiving way to error. The Swedish Road Administration lays the key rules of Vision Zero's philosophy as explained below how Vulnerable road users* should not be exposed to speed higher than 30 km/h and in higher speeds they should be separated; for example, pedestrian bridges, or separate lanes with barriers for cyclists (Swedish Road Administration, 2010). Moreover, Vision Zero lists some of the road design conditions to separate vehicles of different weights on highways to ensure safety.

VISION ZERO'S INTEGRATION AND SEPARATION PHILOSOPHY

1. Vulnerable road users* should not be exposed to motorized vehicles at speeds exceeding 30 km/h
2. If 1. cannot be satisfied then separate or reduce vehicle speed to 30 km/h
3. Car occupants should not be exposed to other motorized vehicles at speeds exceeding 50 km/h in 90 degree crossings
4. If 3. cannot be satisfied then separate or reduce angle or reduce speed to 50 km/h
5. Car occupants should not be exposed to oncoming traffic (other

vehicles of approximately same weight) at speeds exceeding 70 km/h or 50 km/h (if oncoming vehicles are of considerably different weight)

6. If 5. cannot be satisfied then separate, homogenize weights or reduce speeds to 70(50) km/h

7. Car occupants should not be exposed to the road side in speeds exceeding 70 km/h or 50 km/h (if road side contains trees or other narrow objects)

8. If 7. cannot be satisfied separate, remove objects or reduce speed to 70(50) km/h

2.3 Safer Vehicles

This set of literature shows the importance of vehicle safety standards in reducing road crashes and saving lives. The most renowned motor vehicle standards are found in the U.S. and the European Union, and there are also the UN vehicle regulation agreements which several countries have signed at least one of their three agreements (Glukhenkiy, 2017). Due to the abundance in research and thorough reports carried by the U.S. National Highway Traffic Safety Administration (NHTSA) to constantly evaluate the outcomes of the continuously updated Federal Motor Vehicle Safety Standards (FMVSS) using Fatality Analysis Reporting System (FARS) data, this part of the literature focuses on previous research carried on different FMVSS in reducing road fatalities to show the importance of safe vehicles in saving lives on the road.

To evaluate the success of vehicle safety technologies, a detailed report was carried by the NHTSA to review the effectiveness 26 different FMVSS. The review showed that these safety standards have saved about 613,501 between the years 1960 and 2012 (Kahane, 2015). More studies and reports were carried by NHTSA to evaluate various FMVSS over the years and highlight their impact on saving lives. A report on airbags showed the vital role side airbags can play upon collision. The report examined the effect of different types of side airbags in near side impacts using logistic regression analysis of FARS data, the four types of side airbags examined were the torso only, curtains only, combination- head and torso; and

curtains plus torso. The results showed significant estimated fatality reduction percentages with torso only at 7.8 percent; curtains only at 16.4 percent; combination at 24.8 percent; and curtains plus torso at 31.3 percent fatality reduction (Kahane, 2014).

As for brake systems, different brake systems have been around for decades, but they have been evolving along with cars over the years. Antilock Brake System (ABS) was first introduced in the United States in the late 1960s, and by the mid-90s it became a standard in many cars. ABS controls the wheels in the vehicle in a way that prevents the car from skidding. However, reports on the effectiveness of ABS in reducing crashes came conflicting. NHTSA carried a research program in the area of light vehicle ABS. The program entailed several tasks to study the effectiveness of Antilock Brake Systems. A technical paper written by Garrot and Mazzae (1999) gave an overview of the program results. The ABS proved effective in significantly increasing multi-vehicle crashes and pedestrian fatal strikes but showed a significant increase in single-vehicle road departure crashes. The paper concluded that the ABS safety benefits are approximately canceled by its safety benefits. Then came the Electronic Stability Control (ESC) system, a newer innovation which was introduced in the mid-1990s. The ESC, which is a spinoff the ABS, was designed to tackle the safety dis-benefits of the ABS. Instead of braking all four wheels at once like the ABS the ESC uses sensors to control one or more wheels once a loss of the driver's control is sensed (IIHS, 2006). NHTSA issued a statistical evaluation of ESC in 2011 based on FARS data between the years 1997 and 2009. The analysis estimated that ESC reduced first event rollovers by a staggering 56 percent for cars and 74 percent for light trucks, SUVs, and vans

(LTVs); moreover, it helped car drivers avoid multiple collisions by 18 percent, and reduced collision with fixed objects by 45 percent for both cars and LTVs. As a result, in 2012 the American FMVSS introduced article No. 126 “Electronic Stability Control Systems” which mandates ESC to be standards on all new passenger cars, multipurpose passenger vehicles, trucks and buses up to 10,000 pounds (Kahane, 2014).

2.4 Safer Road User Behavior

- Wearing a motorcycle helmet correctly can reduce the risk of death by 40% and the risk of severe injury by over 70%.
- Wearing a seat-belt reduces the risk of a fatality among front-seat passengers by 40–50% and of rear-seat passengers by between 25–75%.
- If correctly installed and used, child restraints reduce deaths among infants by 70% and deaths among small children by between 54% and 80%. Source: World Health Organization [Fact Sheet], 2018

The safe system approach focuses on accounting for human error to be absorbed by the system if implemented correctly. However, one of the UN's pillars is dependent on the concept of **Safe Road Use**. Safe road use focuses on educating the operator of vehicles about risk factors; such as, driving under the influence, speeding, breaking the law, and distracted driving. Driving is a tedious process which requires full concentration; hence, impairment is considered a threat to the overall process of safe driving. There are multiple laws and regulations globally to control drunk and drugged driving. Alcohol and drug tests are carried out to determine the level of intoxication through Blood Alcohol Content (BAC) levels and/or Tetrahydrocannabinol (THC) levels to determine the level of intoxication of drivers when needed (Casanova et al., 2012; Ramaekers et al., 2000). While several countries have different levels of acceptably legal BAC and THC (WHO, 2018). However, with the aim of reducing road fatalities more countries are now introducing a zero tolerance for novice drivers of any age, and commercial drivers (Avenoso, 2017).

A famous study in Michigan U.S. called the Grand Rapids Study investigated the role of the drinking driver in traffic accidents. The study found that drivers with BAC levels above zero were more prone to be involved in accidents over drivers with zero BAC level, also drivers with BAC levels higher than 0.04% were definitely associated with a higher risk

of traffic accident involvement, and the risk increased rapidly reaching 0.08%, and becomes extremely high with 0.15% and above. In WHO's Global Road Safety Partnership (GRSP 2018) good practice manual it was reported that in high income countries 20% of traffic drivers deaths had excess alcohol in their blood levels, and in low- and middle- income countries up to 69% of fatally injured drivers had alcohol in their blood.

As for the THC level and the risk of collision, in an observational meta-analysis study conducted by Asbridge et al. (2012), they found that drivers who drove under the influence of cannabis were associated with a much higher risk of traffic collision compared to other drivers who had a zero THC level in their system.

Motor Vehicle injuries can be reduced through protective measures such as helmet use and seatbelt use. The NHTSA has found that helmets can reduce the risk of road deaths among by 37% and the risk of brain injuries by 65%; moreover, motorcycle riders wearing helmets are 60% less likely to suffer fatal head injuries when compared to those riders without helmets (Ulmer et al., 2003). Although Egypt has mandatory helmet use for motorcycle riders, a study carried out in Egypt's Mansoura Emergency Hospital showed that none of the 200 motorcycle riders involved in accidents admitted to the hospital between August 2014 and April 2015 wore helmets. Most of the motorcycle riders in Egypt do not abide by the helmet law due to the low socioeconomic level, recklessness, and lack of education (Fouda et al., 2017).

Moreover, safe road use envelops a system where road traffic reduction is highly encouraged by the government through developing a wide public transport infrastructure. Public transportation is considered a much safer mode of transport. It only has a tenth of road traffic injuries compared to other motor vehicle transports, so commuters decrease their chances of involvement in a road accident by 90% when they use public transport (Litman, 2016).

2.5 Post-Crash Response

This set of literature is guided by the World Health Organization's detailed publication on post-crash response under the name Post-crash response: Supporting those affected by road traffic crashes. The document divides post-crash response into 3 stages; (1) at the scene; (2) at the treatment facility; and (3) follow-up. The at the scene and at the treatment facilities stages are crucial in saving lives, while the follow up stage is more focused on rehabilitation, management of disability and workplace integration. However, this set of literature focuses on previously published research on the first two stages only as they are more related to the core of this research. Moreover, low- and middle-income countries have problems executing the first two stages of post-crash care making the third stage a luxury for high income countries. Most of the world's population do not have access to prehospital care. The majority of death within the first hours of the crash are a result of hemorrhage, airway compromise, or respiratory failure, all of which can be treated using first aid measures (Varghese et al., 2005)

Ideally the first post-crash response at the scene is done by bystanders through contacting a responsive free of charge universal number which is linked to a centralized ambulance dispatch system. An equipped ambulance with trained personnel is rapidly dispatched to the scene. The necessary live saving care is carried out, and the patient is transported to a treatment facility. Post-crash care is a time sensitive process; therefore, in addition to the universal number, the fleet size, and the ambulance location and coverage are key elements in providing timely response (Zaffar et al., 2016).

There are different levels of treatment facilities varying from clinics to trauma centers, and the ambulance should transport the crash victim to the appropriate facility based on the level of injuries. Serious injuries should be transported to higher-levels of facility treatments (WHO, 2016). A study in Victoria, Australia showed that after the introduction of an

organized and inclusive trauma system has resulted in significant reduction in trauma patients. Using an injury severity score system, it was found that when the injury severity is matched with the appropriate level of health facility results in better outcomes, avoidable deaths and better use of resources. The study shows that the continuous data and feedback collection, monitoring and evaluation of the trauma system has been a key element in its success to reduce the mortality rate of trauma patients and suggest a trauma system should be the standard of health jurisdictions internationally (Cameron et al., 2008)

Chapter 3: CONCEPTUAL FRAMEWORK

Traditionally Road Safety has been based on the concept of the three Es which was created nearly a century ago. The three Es are **Engineering**, **Education** and **Enforcement**. Engineering has been divided into safe roads engineering and safe vehicles design. As for education the concept focuses on the necessary education need for drivers to obtain a license and also on educating the public in general to increase road safety awareness. While enforcement focuses on controlling and influencing drivers' behaviors for safer roads (Bagnara et al., 2018).

Although a holistic approach of the three Es concept has helped many countries in reducing their road fatalities and increasing the measures of their road safety (OECD, 2004), the new safe system approach takes road safety several steps further. The safe system approach has been derived from the Swedish Vision Zero, and the Dutch Sustainable Safety strategies (PACTS, n.d.). The safe system approach adopts the three Es concept but additionally addresses more attributes taking into consideration human fallibility. The approach accepts human errors as inevitable and takes into consideration the vulnerability of the human body in case of error occurrence (International Transport Forum, 2016).

In March 2010, The United Nations General Assembly proclaimed a Decade of Action for Road Safety (2011-2020). The UN's conceptual framework is based on the successful safe system approach. Hence, this study adopts the UN's conceptual framework (See Appendix B). The framework consists of five pillars which are centered on implementing activities mainly at a national level rather than a global level. Governments are urged to provide the means for executing those activities while taking into consideration their own road safety policies and strategies (WHO, 2014). The five pillars as follows:

Pillar 1	• Road Safety Management
Pillar 2	• Safer Roads and Mobility
Pillar 3	• Safer Vehicles
Pillar 4	• Safer Road Users
Pillar 5	• Post-Crash Response

Source: WHO, 2014

The first pillar, **road safety management**, decrees that countries ought to establish “multi-sectoral partnerships” and other related agencies that would aid in formulizing strategic plans for local road safety measures based on the collection and assessment of the current regional conditions. Countries could set those targets complying with the UN accords related to road safety and by prompting the creation of local organizations like the European Agreement that created the International Road Transport (AETR). Another target that falls under the first pillar is the creation of a main strategic agency dedicated to road safety, which includes different sectoral bodies. In addition, the Road Safety Management urges the development of a regional strategy that would set guidelines for responsibilities and financial priorities. Those strategies would be based on “the analysis of national traffic crash data” so as to have a coherent framework for setting targets as well as to draw a clear funding plan.

The second pillar, **safer roads and mobility**, aims to enhance the road networks’ conditions to provide safer roads for users, particularly those who are most prone to accidents such as, for instance, the “pedestrians, bicyclists, and motorcyclists.” (SWOV, 2012). Countries are urged by the UN to meet this target through eradicating all “high risk” roads by

the year 2020 and allocating 10% of the government's budget towards creating safer roads and infrastructure. Furthermore, it encourages countries to include the planning of safer mobility in their urban plans and land-use. This could be done through considering different means of transportations when establishing new buildings or infrastructure in order to ensure safety usage of the roads. Incorporating different bodies in the country in creating safer roads such as “development banks, national authorities, [and] civil society” would help raise awareness and knowledge towards the issue and that the targets could more feasibly met and applied.

The third pillar, **safer vehicles**, is centered on prompting countries to promote guidelines for motor vehicle safety and to set assessment programs for new vehicles in order to ensure their safety usage. Furthermore, countries are urged to include new technologies in vehicles that would aid in avoiding crashes such as “Electronic Stability Control and Anti-lock Braking Systems.” This could also be achieved through hindering export or import operations that deal with used cars that do not meet new safety standards. Lastly, this target could be met through motivating individuals working both in public and private sectors to purchase cars that have safer standards that would ensure the protection of users.

The fourth pillar, **safer road users**, focuses on enhancing the behavior of road users. This could be done through raising awareness amongst road users to, for instance, wear seatbelts and helmets as well as highlight the issues of drink-driving and high-speed driving. To achieve this, a country could create a series of awareness campaigns that could influence safer road use behavior. Moreover, guidelines are to be established in regards to setting regulations that would safeguard the road users' compliance with speed limits and avoiding drink driving and other related issues that would lead to crash or injury.

The last and fifth pillar, **post-crash response**, aims at achieving a very important target. It encourages enhancing post-crash responsiveness level to deliver an improved emergency response system that would better deal with crash cases in order to ensure that the pre-hospital

care would aid in the better rehabilitation of the crash victims. This would include developing the know-how system of removing crash victims from vehicles and enforcing a unified emergency call number throughout the country. Moreover, it encourages countries to improve physical and psychological health support to victims in order to minimize trauma through establishing a proper hospital trauma care system. Additionally, this pillar urges countries to develop better insurance programs for road users in order to finance more enhanced rehabilitation systems for victims.

Chapter 4: METHODOLOGY

This research was carried over the course of two years between February 2017 and February 2019. The findings of this research relied on two sources of data 1) qualitative data of in-depth interviews and participant observations, which were documented through interview transcripts, field notes, videos and pictures; and 2) quantitative data analysis.

The qualitative data collected in this research are divided into in-depth interviews, and field observations, and car patrolling to document the road safety conditions using videos and photos. Moreover, crashes reported in newspapers, television shows, and circulated on social media portals were examined to identify trends. A total of 28 in-depth interviews were conducted and the interviewees were divided into three samples. The First sample consisted of 10 crash victims which were defined as anyone a road traffic crash entailed a physical, emotional and/or financial damage on their lives. For instance, some of the crash victims are a mother who lost her little girl in a crash, a first-hand crash witness, a young woman who fractured her ribs in an accident, a young man who endured financial losses after his car was destroyed in a crash by a drugged microbus driver... etc. Crash victims were reached through a chain of referrals (snowballing). Initially, this study contacted crash victims after obtaining their contacts from referrals. Although they have agreed to share their story and the details of losing their loved ones in a road crash, this method was not correct. It has brought severe emotional distress and depression to me as a researcher and to some of the crash victims upon recalling the gruesome details of the crashes. Specifically, the details of some of the crash victims who lost several and/or all of their family members in road crashes. The effects of collecting crash victim data without a filter initially compromised this research. Hence, the study revisited the crash victims' data collection method. This time the referrals were asked to only refer crash victims who have made adequate emotional recovery from the trauma.

Due to the constraints of this research and this filter, the sample yielded only 10 crash victims. The second sample consisted of 11 current and former government officials between senior rankings to lower rankings. The sample size had a number of constraints such as access to government officials, approvals and time. The interviewees were approached based on their job positions, and in some cases snowballing through referrals within the sample. The sample included current and former government officials at CAPMAS, the Ministry of Interior, the Ministry of Health, the Ministry of Transportation, and the Ministry of Finance. The third sample consisted of interviews with seven (7) stakeholders from the private sector. This sample was also nonrandom, and the interviewees were selected based on their job positions and referrals. It consisted specifically of a private hospital manager, two private engineering consultants, an Egyptian law professor, a university student, and two commercial truck drivers. The third sample was created to triangulate the information from some of the government officials in the same field but in the private sector to understand if both the private sector and the public sector face the same challenges and discuss some of the solutions like in the case of a public hospital manager and a private hospital manager. As for the truck drivers, they were selected to know more about their problems and challenges since truck drivers were widely criticized by the crash victims and there is a public discontent about their driving behavior in Egypt.

The interviews were conducted following the instructions of AUC's Institutional Review Board (IRB). An IRB approval was obtained in February 2017 and renewed for a second year in February 2018. The interviewees were all briefed about the research and notified that their identities will not be revealed throughout this research. For the government officials specifically, their job positions are not mentioned, only the governmental body they belong/belonged to was mentioned. In addition to the 28 interviewees, the study transcribed one television interview with the former Chairman and the current member of the Transport

Committee at the Egyptian Parliament and the Former head of the Egyptian General Directorate of Traffic in Giza. Moreover, the study includes snapshots from a video aired on dmc TV channel of a Member of the Egyptian Parliament, lifting parts of a newly paved road in AL-Behera governorate. The video reflected on the corruption in the public road works.

The research began with interviewing some of the crash victims, and according to the data collected from the crash victims the study was able to form many of the interview questions with the government officials and the private sector stakeholders. The sample of the government officials consisted of some senior officials along with lower ranking officials for a better sample. Along with the request for an interview, a letter from the AUC's Department of Public Policy and Administration was presented to the interviewee explaining that I am a graduate student conducting a research on road safety. It was also mentioned that this research will conceal the identity and the job position of all of its interviewees. The topic was appealing to several officials and the fact that their identity would remain anonymous to the readers would guard them against any trouble. Additional crash victims were interviewed at a later stage to assess the pillar of road users' behavior in Egypt from the road users' perspective.

In addition, the study carried field observations through documenting the road safety conditions on a weekly basis using videos and photos since February 2017 until February 2019 to reflect further on the current road safety conditions. Visual documentation of the road safety conditions is vital, since the research publications on the country's road safety conditions are scarce. The main purpose of the visual data is to support the authenticity of this research findings and defy the published statistics discussed in the data dilemma section which reflects an enhancement in the country's road safety conditions. A series of photos and videos were taken at various locations in Cairo, but the majority was in New Cairo, since it is predominantly middle-high-income community. The violations and poor road conditions in New Cairo reflect

that the situation is worse in the poor and low-income communities. The study categorized the photos based on their contents following the five pillars and used many of them in each sub section in the results findings. Some of the 2017 captured photos and videos were used as data reference in some of the interviews; however, only recent photos from 2018 and 2019 were added to Appendix A to show that the road safety challengers are recent and still on going to date. Through the photos the readers will be able to link some of the data obtained from the in-depth interviews to real life visuals and relate to the road users experience.

Several motor vehicle crashes were researched whether they were mentioned in some of the interviews or have had received a wide public attention on the social media platforms. Then the study focused on these specific crashes further by researching them in newspapers, and television interviews to investigate similar crashes and observe a trend if there were any. Several school bus crashes were researched to identify commonalities along with crashes that included truck drivers.

Furthermore, the study analyzed some of the published data on Egypt's road crashes and injuries, and a serious discrepancy in data was found. The data discrepancy is discussed further in Chapter 5, Findings and Discussions. The data analysis was carried on the data published by the Egyptian Central Agency for Mobilization and Statistics (CAPMAS), the World Health Organization, and the World Bank for the years between 2008-2017. The data analysis showed a discrepancy among all three sources; moreover, it showed a discrepancy even among different publications by CAPMAS. CAPMAS's Cars & Trains Accidents bulletin and CAPMAS's Health Services Statistics bulletin each showed different numbers for the annual road traffic injuries for the same exact years. The data in the Cars & Trains Accidents bulletin are retrieved from the Ministry of Interior, while the data in the Health Services Statistics (Ambulance) bulletin are retrieved from the Ministry of Health. The analysis showed that each governmental data source reported a different number of road

injuries for the same exact years. For instance, the recorded road traffic injuries by the Ministry of Interior in 2014 were 24,154 while the recorded traffic injuries by the Ministry of Health were 167,364 for the same exact year. The study found that the Ministry of Health adds trains and metro injuries to its crash fatalities published data in the Ambulance Health Services bulletin. Prior to 2015, the bulletin provided a breakdown to the types of injuries; hence, the study compiled the number of trains and metro injuries which was found to be very small. After the deduction from the total number, the recorded traffic injuries by the Ministry of Health still remained so much bigger than that recorded by the Ministry of Interior. Hence, the notable data discrepancy remains unjustified.

Finally, the study concluded this research based on the reviewed literature and the research findings and discussion chapter. A set of policy recommendations followed the conclusion with the objective of reflecting some global best practices. The recommendations are aimed to eliminate the challenges in road safety in Egypt.

Chapter 5: ROAD SAFETY IN EGYPT: THE DATA DILEMMA

The Road Safety Management pillar in the UN's conceptual framework highlights the importance of a road safety strategy underpinned by data and research (See Appendix B). The monitoring and evaluation of the strategy and its activities are carried also using data to measure performance. Data are used by decision makers to guide them through their decision-making process. A successful road safety policy and a strategy would require accurate data to evaluate current conditions and place measurable targets. The process of monitoring and evaluating the progress of all the activities carried under a road safety strategy would require accurate data. Without accurate data road safety problems cannot be tackled, and the problems will continue to get more complex. This chapter discusses the problem of the discrepancy in Egypt's crash data, specifically the road fatalities and injuries data. The first section explains how Egypt's crash data in the years following Jan 25th, 2011 revolution show an unjustified significant decrease in the reported data on Egypt's fatalities and injuries. This decrease goes against the country's population increase, vehicles increase, and all the findings in this chapter. Most importantly the decrease goes against the fact that there were no official announcements for a road safety policy nor interventions with clear targets and objectives to match the magnitude of the reported decrease over that specific period of time to date. The following subsections explain the data dilemma in further details.

5.1 Unjustified Decrease in the Reported Vehicle Crash Data after 2011

An unjustified decreasing trend was discovered in the data in the years following 2010. Egypt's population has been steadily increasing for the past decade, more vehicles are on the

road, Egypt has a problem in traffic enforcement, as it will be explained further in chapter 6; moreover, no intervention programs on a wide scale with clear objectives and targets have been fulfilled in the country over the last decade to justify the decreasing trend. According to the World Health Organization, road crash fatalities are expected to increase in low- and middle-income countries unless there are increased efforts and intervention programs (WHO, 2015).

In 2010 Members of the UN Road Safety Collaboration formed a consortium to create a Road Safety Program, the RS10, through donations from Bloomberg philanthropy to tackle road safety issues and reduce road fatalities in 10 low- and middle- income countries that account to more than 600,000 road traffic deaths annually. Egypt was selected among the 10 countries which included China, Brazil, India, Cambodia, Russia, Kenya, Vietnam, Turkey, Mexico, and Egypt. Egypt came first with the highest road traffic deaths rate per 100,000 population among the 10 selected countries. Egypt 41.6; Brazil 18.3; Cambodia 12.1; China 16.5; India 16.8; Kenya 34.4; Mexico 20.7; Russia 25.2; Turkey 13.4; and Vietnam 16.1 respectively (WHO, 2010). However, the RS10 program did not continue in Egypt. Egypt's name was removed from the ten countries list on the WHO's Global and Road Safety program's website and the whole program was renamed to Bloomberg Philanthropies Global Road Safety Program 2010-2014 to include only the other nine countries China, Brazil, India, Cambodia, Russia, Kenya, Vietnam, Turkey, Mexico (Bloomberg Philanthropies, 2012, 2014) . The program was renewed again for a second phase in 2015, and Egypt was not included in the second phase (Bloomberg Philanthropies, 2015). While there are no official statements explaining why the program did not continue in Egypt to fulfill its purpose, it could have been due to January 25th revolution in 2011 which shortly happened after the program was initiated. The country had an extended civil unrest and a second revolution on June 30th, 2013. No other large scale global or national road safety programs with clear targets and objectives were introduced after the incomplete RS10 to justify Egypt's decreasing recorded road traffic crashes, fatalities and injuries in the years following 2010. While there are no official statements explaining why Egypt was removed from the list, it could have been due to the revolutions and the civil unrest the country witnessed in the years following the Egyptian revolution in 2011.

The information proves that no substantial intervention in Egypt's road safety existed to reflect the unexplainable decreasing trend in the country's road fatalities since 2011 to date. No other clear road safety programs have been introduced to tackle the road safety problem in Egypt on a national scale since the incomplete RS10 in 2010 to date. Hence, the decreasing trend in Egypt's road fatalities and injuries given also the increasing rate in Egypt's population and licensed vehicles is unjustified.

Although, Egypt has witnessed one of its biggest revolutions in modern history in January 25, 2011, and many years of unrest and instability followed the revolution, Table 1 below shows a significant decrease in the recorded vehicle crashes, fatalities, injuries and daily crashes following the year 2011. Moreover, there has been a significant increase in the Egyptian population, and the number of registered vehicles in the country since 2011. Hence, the road fatalities and crashes should be increasing in number not decreasing as shown in the published Egyptian data. Figures 2-4 (See Appendix A) illustrate the unjustified decreasing trend in the crash data in comparison to the country's population growth and vehicles increase in the absence of an intervention.

Table 1: Recorded population, vehicles and crash data in Egypt

No. of Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Population	79,537,253	80,953,881	82,465,022	84,107,606	<u>85,897,561</u>	<u>87,813,257</u>	<u>89,807,433</u>	<u>91,812,566</u>	<u>93,778,172</u>	<u>95,688,681</u>	<u>97,553,151</u>
Vehicles¹	4,240,956	4,686,992	5,159,240	5,853,728	<u>6,369,436</u>	<u>6,607,432</u>	<u>7,037,954</u>	<u>7,860,864</u>	<u>8,636,120</u>	<u>9,351,725</u>	<u>10,320,135</u>
Vehicle Crashes	22,900	20,938	22,793	24,371	<i>16,830</i>	<i>15,516</i>	<i>15,578</i>	<i>14,403</i>	<i>14,548</i>	<i>14,710</i>	<i>11,098</i>
Vehicle Crash Fatalities	6,666	6,603	6,486	7,040	<i>7,115</i>	<i>6,431</i>	<i>6,700</i>	<i>6,236</i>	<i>6,203</i>	<i>5,343</i>	<i>3,747</i>
Vehicle Crash Injuries	31,187	35,718	35,428	36,028	<i>27,479</i>	<i>21,620</i>	<i>22,397</i>	<i>24,154</i>	<i>19,325</i>	<i>18,646</i>	<i>13,998</i>
Accidents per day	63	57	62	67	<i>46</i>	<i>43</i>	<i>43</i>	<i>40</i>	<i>40</i>	<i>40</i>	<i>30</i>

Source: Author's compilation based on CAPMAS' Cars &Trains Accidents Bulletin (multiple years)

Population data based on World Bank (<https://data.worldbank.org/country/egypt-arab-rep>) accessed in June 2018

The Table shows an unjustified decrease in the Crash Data although there is a noticeable increase in the Population and Number of Vehicles Dat

¹ The number of Vehicles includes heavy equipment and Tuk Tuk

5.2 Uncommon Road Fatalities Data Collection Methods in Egypt

This study analysis Egypt's crash data further by examining the used crash data collection methods. The study found the used data collection method in Egypt is uncommon in developed countries and in the majority of the Arab world. Countries such as the United States, the United Kingdom, Germany, France, Italy, Finland, Sweden, Netherlands, Greece, Switzerland, Austria, Spain, Canada, Australia and many other countries report their data on crash fatalities with a common standard definition as *died within 30 days of crash*. Meaning all crash victims who lost their lives at the crash scene, on the way to the hospital, and all the other crash victims who later die from their injuries at the hospital within 30 days from their crash date are reported as road fatalities. While Egypt only reports those, who die at the crash scene only in its annual road fatalities statistics. Meaning all crash victims who die while being transported from the crash scene to the hospital or those who died at the hospital are not reported as road fatalities in Egypt.

The method of reporting only *died at crash scene* has been the data collection method of Egypt's road fatalities even in the years before January 25th, 2011 revolution; hence this is not a justification for the unjustified decrease in the country's road fatalities in the years following the revolution. However, this shows that even the officially unjustified reported figures are underreported due to the data collection method of reporting only those who *died at scene of crash* (CAPMAS, multiple years). Table (2) below shows how all the Arab country's road fatalities are reported in WHO's Global Status Report on Road Safety 2015 with the majority of them reporting their road fatalities defined as *died within 30 days of crash* while five countries have even more accurate road fatalities data collection method with the definition of *Unlimited Time Period Following the Crash* (World Health Organization, 2015).

The Global Status Report on Road Safety 2015 included all the Arab countries except for the following Arab countries; Syria; Comoros; Djibouti and Mauritania. However, it is important to note that before the Arab Spring, Syria was in the Global Status Report on Road Safety 2009 and its data were defined as *died at the crash scene or hospital*, and Yemen had a longer period for collecting data prior to the war which was 7 days in the Global Status Report on Road Safety 2009 compared to the current collection methodology which is *within 24 hours of the crash*. This shows that Egypt has been always the least country that reports its road fatalities among all the reported Arab countries with defined crash collection methods.

Table 2: Road Traffic Fatalities Definition

COUNTRY	DEFINED AS DIED WITHIN 30 DAYS OF CRASH	DEFINED AS DIED AT SCENE OF CRASH	OTHER
ALGERIA	√		
BAHRAIN			<u>UNLIMITED TIME PERIOD FOLLOWING THE CRASH</u>
EGYPT		√	
IRAQ			<u>UNLIMITED TIME PERIOD FOLLOWING THE CRASH</u>
JORDAN	√		
KUWAIT			<u>UNLIMITED TIME PERIOD FOLLOWING THE CRASH</u>
LEBANON			<u>UNLIMITED TIME PERIOD FOLLOWING THE CRASH</u>
LIBYA			DIED WITHIN 48 HOURS OF THE CRASH
MOROCCO	√		
OMAN	√		
QATAR	√		
SAUDI ARABIA	√		
SOMALIA			UNDEFINED
SUDAN			<u>UNLIMITED TIME PERIOD FOLLOWING THE CRASH</u>
TUNISIA	√		

UNITED ARAB EMIRATES	√		
PALESTINE²	√		
YEMEN			WITHIN 24 HOURS OF THE CRASH

Source: Global Status Report on Road Safety (2015)

According to the American National Highway Traffic Safety Administration (NHTSA) 40% of all drivers killed in fatal car crashes died at the hospital, while 4% of these drivers died on their way to the hospital (NHTSA, 2007). The medical care system in Egypt is not as advanced as the medical care system in the United States, hence, it can be assumed that the killed road fatalities in Egypt which die after being transported to the hospital and during transportation exceed 40%. Hence, it can be argued that the published number of Egypt's road fatalities is missing more than 40%. However, this could also be debatable because the American Federal Motor Vehicle Safety Standard ensure that vehicles in the U.S. have high safety standards while Egypt lacks high vehicle safety standards which are discussed further in section 6.3. This could mean that more crash drivers die immediately at the crash scene in Egypt than in the U.S. However, this does not change the fact that many road fatalities are not counted in Egypt due to the uncommon data collection method.

² The Arab World unanimously has always acknowledged Palestine, and the United Nations has recognized the sovereign state of Palestine in 2012; however, the statistics on Palestine is mentioned under the name of West Bank and Gaza Strip in the Global Status Report on Road Safety 2015

5.3 Conflicting Data

CAPMAS has two different annual publications that report Vehicle Crash Injuries Statistics. The first is the Car & Train Accidents annual bulletin which reports the number of both traffic fatalities and injuries while the Health Services Statistics annual bulletin reports traffic injuries. The Source of data collected in the Cars& Trains Accidents annual bulletin is the Ministry of Interior (MoI)’s General Directorates of Traffic at the level of governorates (A traffic department exists for each governorate in Egypt), while the data in the Health Services Statistics (Ambulance) bulletin is collected from the Ministry of Health (MoH), and it includes data on traffic injuries treated by the ambulance but no data on traffic fatalities. The ambulance law in Egypt mandates that they only transfer alive injured individuals. A hearse, a car specially used for carrying the dead, is responsible for carrying the killed crash victims from the crash scene. Table (3) shows the big difference between the reported traffic crash injuries in the Cars& Trains bulletin versus in the Health Services (Ambulance) bulletin over a period of five years.

Table 3: Traffic Injuries Data from MoH Vs. Data from MoI

Number of. Year	2012	2013	2014	2015	2016	Data Source
Recorded Traffic Injuries	141,920	152,996	167,364	124,867	151,991	Cars & Trains Bulletin
Recorded Road Traffic Injuries	21,620	22,397	24,154	18,646	19,325	Health Services (Ambulance) Bulletin

Source: Author’s compilation based on CAPMAS’ Cars &Trains Accidents Bulletin and the Health Services Statistics (Ambulance) Bulletin (multiple years)

However, the study found that the data on traffic injuries in the Health Services Bulletin which is retrieved from the Ministry of Health includes road traffic injuries in addition to train and metro injuries, unlike the Ministry of Interior’s data in the Cars & Trains

bulletin which separates between road traffic crashes and train crashes. Prior to 2014 CAPMAS's Health Services bulletin had a breakdown for the traffic injuries mentioning the exact numbers of train and metro injuries. Hence, 2014 was taken as a sample and deduct the train and metro injuries were deducted from the Traffic injuries to get the net of the road traffic injuries and compare it to the reported road traffic injuries retrieved from the Cars&Trains bulletin. The data in Table 4 shows very minimal change in the net road traffic injuries reported in the Health Services (Ambulance) bulletin after deducting the small number of train and metro injuries. The Cars & Trains bulletin recorded 24,154 road traffic injuries in 2014 while the Health & Services (Ambulance) bulletin recorded a net of 163948 road traffic injuries with 75,518 injuries caused by private vehicles alone. The discrepancy in data is extremely high.

Table 4: Breakdown of Traffic Injuries and net Road Traffic Injuries

Type Year	2014
Tram & Public Buses	9498
Private Vehicles	78518
Bikes/Motorbikes	45404
Trains	3403
Metro	13
Others*	30528
Total	167364
Net Road Traffic Injuries = Total - (Trains + Metros) =	163948

Source: Author's analysis based on CAPMAS's Health Services (Ambulance) 2014 bulletin

*Others are defined as the road's Tuk Tuk and Carriages; hence, they remained in the calculation

The ambiguity and un-alignment of Egypt's data on road traffic fatalities and injuries was also found in international publications. For instance, the data found on Road Fatalities and injuries in the WHO's Global Status Report (GSR) on Road Safety, reported Egypt's crash

fatalities in 2007, with the same data definition of *died at the scene of crash* as CAPMAS's. Yet the data indicated that Egypt's road crash fatalities were 12,295, and the road crash injuries were 154,000. The data source in that report was mentioned as the Egyptian Ministry of Health (2009) (See Appendix B). While CAPMAS reported only 6,666 road crash fatalities with the same data definition of *died at the scene of crash* and only 31,187 road crash injuries for the same year 2007.

It is important to note that the Data given to WHO by the Ministry of Health regarding Egypt's road fatality was not found to be accessible in public records unlike all of CAPMAS's publications which are accessible through their website and in print for the general public. WHO's Global Status Report on Road Safety continued to have different data from that of CAPMAS's since they have been using unpublished data retrieved from the Ministry of Health until 2015.

In 2015 the report changed its data source and used CAPMAS's data found in the Cars & Trains bulletin to report Egypt's road fatalities (See Appendix B). Ever since, there has been an unjustified decrease in Egypt's road traffic injuries and fatalities also in the recent Global Status Reports. The unjustified decrease reported by WHO is controversial because it published a report on Egypt noting that in 2009 Egypt had a road traffic deaths rate of 41.6 per 100,000 populations (WHO, 2012). In addition, Bloomberg Philanthropy who has donated money to the UN to carry out the RS10 program in collaboration with WHO, published that Egypt had an average of 31,000 road fatalities in 2010. Meanwhile, WHO's most recent GSR 2018 claims that in 2016 Egypt road traffic deaths rate has dropped to only 9.7 per 100,000 population. The 2018 GSR also controversially noted that Egypt has the same level of speed law enforcement as some of the world's leading countries in road safety. In the report Egypt received 8 out of 10 for the level of its national speed law enforcement, which was the same score given in the report to Sweden and the United Kingdom. This all

goes against the findings of this study which show that the road safety conditions are getting worse not better. The findings in the following chapter, show that the country does not have enough police officers to enforce the law on its rising population nor does it have a national automated speed enforcement system that could serve as an alternative to monitor road violations. Therefore, it is unfounded that the speed law enforcement in Egypt is at the same level of enforcement in Sweden or the United Kingdom who are leading countries in road safety with traffic death rates of 2.8 and 3.1 per 100,000 population respectively (WHO, 2018).

Chapter 6: FINDINGS AND DISCUSSION

The findings document the country's actual current road safety conditions and identifies the challenges in each area of the five pillars. The data in this chapter was obtained through a series of in-depth interviews with stakeholders and field observations. Visual documentations of the current road traffic conditions were collected to further support the research findings. The following subsections are divided according to the UN's five pillars framework.

6.1 Road Safety Management

This section explores the road safety management conditions and challenges. The data collected from the interviewees reflect on the problems of the poor road safety management conditions in Egypt. The root causes of the problems are divided into three findings which are the absence of leadership, poor traffic law enforcement, and enforcement challenges. The absence of leadership is a cross cutting problem across all the five pillars, but it is especially highlighted in the road safety management as management affects all the other four pillars. Interviewees from the Ministry of Transportation and the Ministry of Interior, and engineers from an involved private sector stressed on the need for leadership on road safety activities. As for crash victims they expressed their discontent from the poor traffic law enforcement in Egypt. The data from some of the crash victims were discussed with officials at the Ministry of Interior and discussed further to understand the third finding, which is why the traffic enforcement in Egypt is poor; i.e. enforcement challenges.

6.1.1 Absence of Leadership

Interviews with current and former government officials at the Ministry of Transportation (MoT), the Ministry of Interior (MoI), and private engineering consultants were conducted to understand more about the execution of road safety activities in Egypt. When the interviewees were asked about Egypt's road safety management, the most commonly criticized problem was the absence of leadership.

The absence of leadership created deeply rooted problems within the traffic police operations. Two MoI officials explained that it usually results in the diffusion of responsibility, and the obstruction of their operations, noting:

We don't know who we belong to, officially our traffic department belongs to the Ministry of Interior, but in real life applications this is not the clear answer. Our Traffic department gets its funding from the governor, so it needs to persuade the governor with its own targets and plans year by year not the Ministry of Interior. If the governor has other targets in mind other than enhancing the traffic conditions, then we don't get the money we really need to function effectively.
(Senior MoI official, personal communication, September 2017)

The second one added,

It is not like we don't know what's happening abroad, we want to do all these nice things here in our country, like the automated enforcement, traffic lights, and police patrolling on highways, extra. If we have money we will do a lot with it, but we just have enough to keep us going as we are. No money for development what so ever.
(MoI official, personal communication, September 2017)

The MoI officials explained that the traffic department lacks identity and a sense of belonging. There is not only a diffusion of responsibility but a diffusion in the organizational structure of the traffic department which results in the absence of a dedicated allocated fund. The senior MoI discusses the problem of finance, and how there is no mandated government budget specified for covering the costs of traffic enforcement in Egypt. When he was asked about the money collected from the traffic fines, he explained that the job of the traffic department is to report the traffic violations and issue fines, but none of the money collected goes to the traffic department.

There is a traffic department for each governorate in the country, and officially these traffic departments belong to the Ministry of Interior; however, their budgets are mandated by the governors in each governorate not by the ministry of Interior. Therefore, each traffic department needs to present their strategy and execution costs annually to their governor and s/he either approves or disapproves the suggested budget. Second, each governor has their own agenda in mind, and it is not necessarily related to improving the traffic conditions, so he explains that the process of allocating their funds turns into a haggling process most of the time to obtain the money they need for their operations from the governor. The majority of the governors' objectives are not aligned with the objectives of the traffic departments, so they try to give them the minimum amount to keep the operations going as they are. Both MoI officials explained that they are fully aware of what happens in developed countries and they wish to see the same applications in Egypt. However, the final result is that the development of the traffic departments in Egypt will never progress this way, because with the lack of fund allocation there is never a place for a vision or a long-term strategy. Even with their day to day activities they still face challenges because the money is usually not fully allocated.

In addition to the problems of finance, the absence of road safety leadership resulted in marginalizing the importance of specialization for traffic police officers. The organizational structure of police officers within the Ministry of Interior does not reflect career stability. Meaning a specialized traffic police officer working in the traffic department can be mandatorily moved to any other police department irrespective of his specialization within MoI at any time. A senior MoI official explains how their jobs and years of experience does not guarantee their continuation within the traffic department, noting:

The feeling of instability and not knowing where we belong is caused by many factors not just where we get the funding from [...] my colleague worked over 10 years in our department [traffic]. He had so much experience in the field and was great at what he did, but one day he woke

up to find himself moved to an irrelevant department that he had no experience in what so ever. His sudden movement was a loss of expertise to our department.
(Senior MoI official, personal communication, September 2017)

The Senior MoI official reflected on what happened to his colleague to explain the instability within the traffic department. His colleague's 10+ years of experience were wasted when he was moved to an irrelevant department where he had no experience in. He expressed that this results in eliminating the sense of belonging and security which the traffic police officers should have. Career clarity and development is an important motivational factor to do a job. In addition, the structure of the traffic authority cannot develop if its expertise is wasted.

While the absence of leadership is the biggest problem obstructing the enhancement of the road safety management in Egypt, officially -on paper- there are two bodies in the government's framework dedicated for traffic and road safety. A 1982 Supreme Council for Traffic was mandated to be formed under the traffic law article 66 for the year 1973. According to the Egyptian law the council is specialized in drafting traffic policies and mandating the programs and framework of the stake holding authorities. However, the Council was never initiated nor summoned ever since it was created, and only remains in the Egyptian law as a sub-article (Fekry, 2017). In addition, Egypt has a national council for road safety, but it does not have any authority, it is more like an advisory board as an MoI official explains:

The national council for road safety doesn't have any legislative power. It recommends some issues related to road safety, but its recommendations are not binding. While the never summoned Supreme Council for Traffic has so much authority mentioned and mandated in the Egyptian law. It is baffling how it is not being utilized.
(MoI official, personal communication, September 2017)

The MoI official explains that there is no real benefit from the national council for road safety, because the council has no authority and its word is not binding by law. While the never summoned Supreme Council for Traffic has a binding authority by law over

stakeholders involved in road traffic activities. Hence, it does not make sense that the Supreme Council for Traffic was never summoned.

The absence of road safety leadership results in government waste of finance, resources, knowledge and even halts its development. A former senior official at the Ministry of Transportation expressed his disappointment about the abandonment of great studies and projects whenever there is a change in the ministry's office, noting:

A newly appointed minister likes to prove himself and introduce new projects and ideas. Some of these ministers would halt the progress of a great project by their predecessors. We have had great studies for much needed projects that never came to light. Money, time, effort and knowledge were just wasted.
(A former senior MoT official, personal communication, April 2017)

The senior official who served at the Ministry of transportation prior to 2011 recalls back the process of a newly appointed minister coming into office. He explained that new ministers were usually excited to prove their competency through conducting studies and introducing new projects. Over the years he came across great project studies, some of which had huge budgets and were covered by either public money or grants. However, many of these projects were never executed because the lifetime of a minister at the ministry does not necessarily guarantee that execution of these studies nor the continuation of some of the projects initiated during his tenure. Government waste is the outcome of the abandonment of many great project studies which are archived at the Ministry, and some of which are now outdated.

Another MoT complained about not seeing the fruit of his hard work when he worked at the ministry because of the absence of leadership which resulted in the lack of coordination and disorganization of priorities among the involved parties, noting:

In my department we collected and reported crash blackspots data. However, several previously reported crash blackspots remain to date. Our job was only to collect and present this data to another government body and that's it.
(A former MoT official, personal communication, October 2017)

Crash blackspots are specific locations where crashes had historically occurred frequently. The MoT official explained that although there is data on the locations of the crash blackspots, crashes continue to happen at some of the reported locations. The ultimate objective of collecting crash blackspots is to prevent the reoccurrence of crashes at the reported locations. However, the intersectoral activity of preventing the reoccurrence is not fulfilled due to the activity's tasks being divided among different government bodies, and once a government body does not fulfil their task, the activity fails, and the objective is not met. He mentions that his department had no authority over the other involved party to ensure the execution of the task, and in general there was no coordination among the stakeholder's multisectoral activities. Hence, several crash blackspots which have been reported years back still exist.

In the case of New Cairo's traffic lights project failure, a senior MoI official explained his deep frustration with the ongoing significant waste of government expenditure. He explained that the traffic department found that the local government in the city of New Cairo (the city is under his department's jurisdiction) placed traffic lights in the streets without any coordination with the traffic department. He explained that they did not even tell them about the project which resulted in its complete failure, noting:

One day we just discovered new traffic lights haphazardly placed in New Cairo. We are the traffic department that operate traffic lights and did not even know about them [traffic lights] until we saw them in the streets. They were placed by the local government without any prior studies or an operational plan. As a result, they caused several traffic accidents, and some were removed, while many others are just standing there non-operative. [...] If they [the local government in New Cairo] have excess money to spend, then why not coordinate with us? [...] It was a fishy project.
(Senior MoI official, personal communication, July 2017)

In this quote, the senior MoI official explained that a local government authority wasted the government's money by placing traffic lights in New Cairo without prior planning. Traffic lights control, and coordination are run by the traffic department. Prior studies for the traffic

flow and traffic design are needed before placing traffic lights, otherwise the traffic lights might result in accidents if they are wrongly placed. In addition, the traffic lights need to have traffic operators which are provide by his department, so it was strange how these traffic lights were randomly placed without any prior notice or consultation with his department. Moreover, he highlighted the waste of government expenditure when he mentioned that some of the traffic lights were removed while other traffic lights still remain non-operational in the streets. He briefly discussed the corruption involved in the project, and how it most likely had other objectives which brought some officials financial gains. He explained that corruption and nepotism is highly found in some local governments. When his department asked about the source of these traffic lights, it was a company he never heard of before.

According to the Egyptian law, the procurement of any public project needs to be done after issuing a public tender with project specifications. However, in the case of the traffic lights in New Cairo, the traffic department knew nothing about the entire project until they found the traffic lights randomly placed in the streets. From the field observations carried out by this study, there is not a single operative electric traffic light in New Cairo, and all the traffic is manually managed by traffic guards, low ranked MoI guards that manually use hand movements to regulate traffic. Figures 5-8 (See Appendix A) reflect further on the state of the haphazardly placed out of service traffic lights in New Cairo.

6.1.2 Poor Traffic Law Enforcement

Traffic law enforcement is directly correlated with the frequency of human error crashes resulting from traffic violations such as speeding, distracted driving, and/or driving under the influence of alcohol and/or drugs. Luca provided evidence that traffic law enforcement had a direct effect on road crash reduction (2015). The high percentages of

human error reflected in CAPMAS's data indicate a high percentage of traffic violations being the main cause of crashes in Egypt. CAPMAS's data showed that 78.9% of the crashes that occurred in 2017 were a result of a human error, and in 2016, 72% of the crashes were a result of a human error (CAPMAS, 2017 & 2018). Moreover, Egypt tried to solve its road traffic problems by changing its traffic law four times since 1998 with the most recent one issued in 2017, yet the problem of poor enforcement continues (El-Melegy, 2017). Several crash victims argued that poor traffic law enforcement is the leading cause of crashes in Egypt. One victim spoke about the drugged state of the truck driver who killed her child, noting:

The truck driver that ran over our car and killed my child was dangerously speeding. He hit the body of our car into another truck in front of us, my daughter did not die from the first hit, but he continued going at it and trying to detach the body of our car, which was partially stuck underneath his truck, so he reversed and crashed us a second time, this is when my daughter died and he fled the crash scene [...] He was later caught and the tests showed that he was seriously drugged. How are these drugged people with these huge vehicles left on the road without being controlled?
(Crash victim, personal communication, November 2017)

The crash victim discussed the details of the crash which caused her severe injuries and resulted in the death of her child. She blames the poor traffic law enforcement for allowing truck drivers to excessively speed on the road and drive under the influence without being controlled. The actions of the truck driver under the drug influence did not pardon the life of her daughter after the first hit, but due to his drugged state his mind was only focused on fleeing the crash scene, so he continued to hit their car for a second time to detach it from his truck.

Another crash victim who witnessed a crash due to a speeding driver under the influence explains:

I was driving on 6 of October bridge when suddenly a car fell off the upper part of the bridge and landed on another car in front of me. I went out of my car and ran towards the cars along with many people. Two young people in the crushed car were instantly dead, while the driver in the car who landed on them was under the influence and was unaware of his surroundings
(A crash victim, personal communication, September 2017)

The crash victim experienced severe distress from what he had seen at the crash scene, especially that the crash fatalities in the crushed car were young people who had no control over the crash. The unaware state of the offender caused his excessive speeding that made his car fly off the bridge and land on another car. His level of intoxication was so high that he remained unaware of what was going on even after the crash had occurred.

All crash victims were asked about the police response to the crash scene. Some of the crash victims involved in non-fatal crashes, specifically non-serious injury crashes, reported that the police did not effectively respond to their calls after noting the state of the victims on the phone.

However, crash victims involved in crashes resulting in serious injury and/or fatalities have reported that the police responded to their calls and reached the scene in a reasonable amount of time. Yet, they had other complaints that went beyond response time; for instance, common complaint regarding the police not taking the necessary measures to document the wrong doings of the crash offenders such as drug tests and properly filled police reports. This made them lose their right at court and some of them could not fully convict the killer drivers because the judge did not have enough evidence on paper, nor were there CCTV cameras to record the crashes. The crash victim who lost her daughter explained that there were no CCTV cameras near the crash scene, noting:

There were no cameras to record the drugged truck driver who hit us several times on purpose to detach the body of our stuck car from his truck. There was no evidence to prove to the judge that my daughter died from the second hit when he hit us again on purpose to flee the scene. So, he got a manslaughter sentence.
(Crash victim, personal communication, November 2017)

Although the truck driver deliberately crashed their car more than once to detach it from his truck, there was not enough substantial evidence to convict him of killing her daughter on purpose. No CCTV cameras were nearby to record the exact events of the crash; hence, the

judge could only give him a manslaughter sentence, which is a minimum sentence for involuntary killing.

Another crash victim explained that because the crash report was not filled correctly, the judge did not have enough material to convict the killer driver, noting:

The crash drawing was not present in the crash report; hence the judge could not do anything. He did not have enough material to convict the driver [...] No cameras recorded the accident.
(Crash victim, personal communication, September 2017)

Crash reports in Egypt are done manually, a police trustee (assistant) is usually the one who fills in the crash report. In addition to collecting the data of the crash victim, and crash offender, he has to illustrate the crash scene by manually drawing it in the report. This crash victim explained that the drawing of the crash scene was not illustrated in the report; hence, the judge did not have enough evidence to convict the offender.

Moreover, there were multiple complaints about the drug tests retrieved from the crash offenders. One crash victim who lost a family member explained:

We could not find the drug test at the police station the second day.
(Crash victim, personal communication, November 2017)

The family could not find the drug test although the crash offender took the test and it came out positive on the day of the crash, but when they family's lawyer went to the police station the next day to collect all the paper work, he could not find the drug test.

As for the interviews with crash victims involved in non-serious injury crashes showed that offenders were not held accountable due to the poor enforcement of the law. All the crash victims involved in non-serious injury crashes had a problem with the police response time to the crash scene, except for one crash victim because there was a police officer nearby her crash scene. Those who contacted the police hot line to report the crash were asked about the type of the crash and whether there were serious injuries involved or not. One crash victim argues that she felt there was a filtration process to assess whether the

police should arrive to the crash scene or not based on the type of crash injuries involved, noting:

The car was totaled [...] I called the police hotline to notify them about the crash, the first question I was asked was “are there any fatalities or serious injuries” and I answered no, then the police did not show up although I called them 12 times in addition to the many other calls made by family. The crash happened at 11.30 am and because they knew I would not stop calling, the police station eventually sent two police trustees on a motorcycle at 5 pm
(Crash victim, personal communication, March 2018)

The victim explained that the car damages were very severe. The victims included her 68-year-old father in-law who was driving at the time, his wife and two children in the car, one of whom is an autistic child who suffered a severe emotional trauma from the crash yet had to wait nearly six hours until the police finally arrived at the crash scene. She insinuated that there is a filtration process used to assess whether the police should arrive to the crash scene or not based on the severity of the crash. Also, when the police finally arrived, there were two police trustees on a motorbike and not a police officer, and they were very uneducated that they even suggested that the victims should break the car of the offender to get even, because the law won't get them a reimburse them for the damaged car, noting:

They told us you won't be able to get any financial rights, this is not the case in Egypt, we are not in Canada. Instead they suggested we take some rocks and crash the offender's car and get equal or beat him up if we like. Their behavior was shocking, but we still persisted on filing a police report [...] A police report was not filed, and my father-in-law was forced to settle with the offender on site for only 4,000 pounds.
(Crash victim, personal communication, March 2018)

The crash victims are Canadian Egyptians, and they expected to see a full process that would protect their rights and reimburse them for the financial losses they have endured. When the police trustees learned of their dual nationality and their high expectations, they explained to them that things do not work this way in Egypt. They would never get back their right through the law because courts here take forever to hand down a verdict, and even if it happens after many years it will be a very small amount of money insignificant to the cost of the car damages. Moreover, the ill-educated police trustees gave the victims bizarre

suggestions to get revenge on the offender such as causing equivalent damages to his car by throwing some big rocks at it, or even physically beating up the offender and close the subject. Eventually a police report was not filed, and the victims were placed in a situation where they had to settle with whatever the offender offered. They were reimbursed a very small amount of money of 4,000 Egyptian pounds which is insignificant compared to the damages the offender caused to their car.

In addition to the data retrieved from the interviewees, field observations documented in figures 9-28 (See Appendix A) reflect further on the poor traffic law enforcement in Egypt. Figure 9 shows a child between the age of 10-12 years old driving a heavy loader on North 90 Street in broad day light. Figure 10 shows a child driving a tricycle on the wrong side of the road. Figures 11-15 show dangerously loaded trucks with the majority of them without license plates driving around the city of New Cairo. Figures 16-18 show private cars driving around the city without license plates. The problem of vehicles without license plates can be observed in different kinds of vehicles including motorcycles such as the one shown in Figure 19.

As for vehicles with license plates figures 20-24 highlight the recent problem of license plates in Egypt. An electronic license plates system was introduced in Egypt in 2008, and by law all vehicles had to change their non-electronic license plates to the new electronic ones which were manufactured in Germany. However, in the years following January 25, 2011 revolution Egypt stopped importing the electronic license plates from Germany (Eskandar, 2012). Since then all the new license plates have locally manufactured in Egypt and they are non-electronic. Many of which are poorly handwritten with markers as shown in the figures. From the field observations it is noted that all the new poorly printed or handwritten non-electronic license plates are issued in all of the Egyptian governorates, except in Cairo and Giza governorates

In 2008, Egypt changed its standard vehicle license plates to electronic license plates manufactured by the German factory Utsch. The new advanced plates were categorized into different colors based on the type of vehicles. The next step was to introduce a wider automated enforcement system to monitor the electronic licenses. However, after the revolution there was a controversy related to directly awarding the contract to the German factory Utsch without competitive bidding (Eskandar, 2012). An Egyptian court in 2011 sentenced Utsch's chairman and CEO to one year in prison in absentia. In return Utsch filed an international arbitration case against Egypt and they no longer supplied the country with electronic licenses (Enterprise, 2017). The number of registered vehicles in 2012 was 6,607,432 and up until the last published registered vehicles data in 2017 was 10,320,135 (CAPMAS, 2017). Hence an increase of 3,712,703 vehicles occurred over this 5-year period without the supply of Utsch's electronic license plates, or an alternative electronic license plates supplier. Instead, Egypt returned back the old license plates system for the newly issued plates which are either manually, printed, sprayed or handwritten. Some of the new license plates are poorly handwritten as shown in some figures below.

Several other road traffic violations were observed as shown in figures 25-27 (See Appendix A), such as the Volvo SUV driven on the opposite side of a highway as seen in figure 25, parking in the middle of the road as seen in figure 26, and parking in a disabled parking spot without a permit as seen in figure 27. It is common in Egypt for drivers without disabilities to occupy disabled parking spots; hence, many parking operators try to combat this phenomenon by placing barricades in front of the disabled parking spots to reserve them for disabled drivers as shown in figure 28.

6.1.3 Enforcement Challenges

The data collected from the crash victim interviewees and the documented photos clearly show that there is a serious problem with traffic law enforcement in Egypt. Hence, this study asked government officials at the MoI several questions drawn from the collected data to understand the root causes of the poor traffic law enforcement problem. In addition, one televised interview with the former chairman and the current member of the Transport Committee at the Egyptian Parliament and the Former head of the Egyptian General Directorate of Traffic was transcribed. The data in this sub section indicated that there are three major challenges hindering traffic law enforcement in Egypt. 1) Shortage in police officers; 2) shortage in automated enforcement; 3) wrongly addressing the shortage.

Shortage in Police officers

All of the interviewed MoI officials indicated that there is a shortage in police officers, and this shortage is a major root cause of the poor traffic enforcement problem. When asked why police officers are not significantly visible on the streets, a senior MoI official explained that it is the case because the total number of all police officers in Egypt is very small, noting:

You don't see us on the streets everywhere because our number is very small, we are around 35,000 police officers. I am talking about actual police officers that graduated from the police academy and are currently in the force, not the police trustees. Out of those 35,000 serving the entire population, a much smaller number represents the traffic police departments.
(Senior MoI official, December 2017)

There are no published data on the exact number of police officers in the Egyptian police force; however, a close approximation of 40,000 police officers in the force was also mentioned by other police officers in a study on the prospects of police reform in Egypt by Allam (2015). The senior MoI official explains that this small number is not just traffic officers, but all kinds of police officers in the Egyptian police force. This number

is very small in comparison to the large Egyptian population which is around 100 million (World Bank, 2017). He clearly explains that this number represents the police officers who graduated from the police academy, it does not include police trustees (*Omnaa Shorta*). Police trustees are police assistants who do not graduate from the police academy but from a police trustees institute, and their job is to assist police officers in carrying out their daily tasks and activities.

When asked about the slow response to crash scenes, one MoI official explained that the understaffing is the cause of the no show or the slow response to many of the crashes.

If an accident happens towards the end of the Sokhna road [highway] for example, it would take the officer most of his day to travel forward to the crash scene and backwards to his base. If an accident happened within a close time range but at the beginning of the road after he already left his station, he will not be able to physically be at the second crash scene. It isn't because police officers are not doing their jobs like some people think of us, it is because we are very understaffed.
(MoI official, personal communication, December 2017)

The MoI official explained that police officers do their jobs and place a lot of effort but due to the fact that they are severely understaffed they cannot tend to the large population and large area of coverage. He gave Sokhna highway road as an example in his explanation to indicate that the occurrence of more than one accident along the same road but in different locations make it difficult for the stationed police officer to tend to them all.

Drawing on the data recorded of truck driver violations, and the data from crash victims about the involvement of intoxicated drivers in the crashes. The MoI officials were asked why these violations go unpunished. A MoI official also linked the shortage of police officers and the lack of alternative enforcement tools noting:

If I catch a truck driver today another one will come tomorrow and do the exact same thing again. We cannot catch them all, we do not have the capacity nor the tools of enforcement to do that, plus many of the truck drivers here [New Cairo] are Bedouins. Especially the ones carrying the building construction materials.
(MoI official, January 2018)

The MoI official explains that they are outnumbered by the truck drivers, so even if they catch one violator there will still be many others committing the same violations. He briefly mentioned the Bedouin truck drivers that dominate the transportation of the building construction materials indicating that they are lawless citizens and difficult to deal with. A Government prosecutor Mohamed Yahya was murdered in New Cairo in 2016 on the hands of Bedouins. The Bedouins had settled in one of his lands illegally and he went to confront them to leave his land accompanied by police forces. The armed Bedouins refused to leave the land and instead shot the government prosecutor five times killing him at the scene, and injuring another police officer (Sobhy, 2016). Hence, there is a general fear from dealing with the Bedouins.

Another MoI official argued that the small number of police officers is not problematic in case there were other tools of enforcements, noting:

Not every law-abiding country has a lot of police officers, but in their cases, they supplement the small number of police officers with advanced automated enforcement. But here in Egypt we lack both.
(MoI official, personal communication, December 2017)

He explains that some countries have a small police population, but in their case, they rely on automated enforcement to support police officers. The problem in the poor law enforcement in Egypt is severe, because Egypt suffers from a shortage in both, police officers, and automated enforcement.

Shortage in Automated enforcement

The former chairman and the current member of the Transport Committee at the Egyptian Parliament and the Former head of the Egyptian General Directorate of Traffic in Giza, openly discussed the problem of the shortage in automated enforcement in Egypt during a telephone interview aired on Al-Mehwar TV channel. He explained that Egypt does not have an automated system for enforcement. There are only very few cameras on the road, but they are not working in an automated way. He said the following to the presenter:

when it comes to monitoring the roads, our roads are not monitored, I am being very honest [...] the cameras that we have are very limited, the ones in Cairo none of them are functioning properly, the ones on the Mehwar [an Egyptian highway] we can't work with them because they only work manually [the pictures and videos need to be manually downloaded from the camera on site][...]. We need the fine to be like abroad, it goes straight to public prosecution and tells the citizen instantly that they have broken the law. If you are instantly notified that you have been fined for breaking the law while driving, will you break the law again? You will not break the law again [...]

(Former Chairman of the Transportation Committee at the Egyptian Parliament, transcribed tv interview, December 2017)

He explained in the interview that the very few cameras that are on some Egyptian roads are not fully automated. Police trustees are usually deployed to the location of each of these cameras to manually download the photos and videos off the camera on a flash drive, and then they return them back to the traffic department to process them and issue fines. The process is very long, and hectic unlike automated enforcement in other countries. He argues that countries with automated enforcement have less traffic violations. The instant notification a traffic violator receives on their phones make them less prone to committing another traffic violation. While in Egypt, traffic violators are notified about the majority of their traffic violations when they renew their car license.

To understand the problem of the shortage in law enforcement even further, The former chairman's comments were discussed with officials from MoI. One MoI official indicated that Cairo's former governor used the consultancy services of a renowned international company in automated service to install cameras in the Cairo city. These cameras were installed, and the project entailed a big budget. However, there was a major issue with these cameras as he explains:

The consultancy company indicated internet fiber optics cables to be connected to these cameras in the project specifications. However, this was totally skipped to allegedly save time and money. Instead 3G Wi-fi connections were installed on some of the cameras. It is impossible to upload and download a 24-hour feed off of 3G Wi-fi instantly, so it has to be done manually. You can use some of these cameras with 3G only to monitor the traffic flow like the former chairman said. [...] This project was a waste of public money, and it was done quickly for the purpose of showing off and taking credit, not to serve the issue of automated enforcement.

(MoI official, personal communication, December 2017)

When the internet fiber optics cables were not installed, the cameras did not become fully automated as a result. In order to download the data from the cameras a police trustee is deployed to the camera's site and downloads the data manually as the former chairman has indicated. The MoI official made several remarks in the above quote briefly discussing the corruption involved in this project. He explained that the governor intended to finish this project as quickly as possible to gain credit and be recognized for his work. Hence, he skipped the fiber optics cable specification deliberately even though he knew that it would seriously affect the outcomes of this project. Eventually, these cameras now are used as just monitors for the traffic flow by the traffic operations room. Finally, he indicated that automated enforcement has to be done in collaboration with the Ministry of Communication and Information Technology, because fiber optics cables need to be extended to new projects that involve automated enforcements.

Wrongly Addressing the Shortage

Some of the interviewed MoI officials complained about the large numbers of Police trustees in the force which they described as a wrong remedy to address the shortage in police officers. Figure 31 (See Appendix A) shows three members of the police force, the one standing in front is a police officer with gold stars on his badge, while the police trustee who is wearing an almost identical uniform has a badge with red lines. Police trustees graduate from a two years institute and not from the police academy and are socially considered as a lower rank of officers. Their socioeconomic level and educational background are much lower than that of police officers, but their numbers are much more than police officers. The exact number of police trustees is also not officially published; however, during the interviews with government officials which

included several police officers they all suggested a common estimated range for the police trustees between the numbers of 150,000-200,000 trustees in the force. This estimation goes beyond four times the estimated number of police officers. Hence, police trustees are the dominant face of enforcement and are used to fill in the job of the understaffed police officers at many cases like the one mentioned by a crash victim above.

However, the wide illiteracy, lack of training among many police trustees affect their work performance which in return affects the work of police officers. A MoI official explains that the task of crash reporting is handled by police trustees; however, the crash data is usually under reported due to the illiteracy and lack of training among trustees. He explains:

Many of the trustees struggle with reading and writing. So, I would say that out of every 1000 crash reports filled no more than a few are filled correctly. This really negatively affects our data collection on crashes, which makes it difficult to collect things like blackspots or understand the trend in crashes in general to tackle a reoccurrence. It also affects those involved in the crash, because lousy crash reports result in victims losing their rights in court or face difficulties with their insurance company if they have one.
(MoI official, personal communication, December 2017)

He explains that the traffic department faces difficulty when compiling crash data due to the fact that many handwritten crash reports are filled by police trustees. Many of these trustees are either illiterate, untrained and/or unqualified to fill the crash reports. Hence, it is difficult to retrieve correct data from the crash reports. Moreover, some crash victims are harmed in the process because the crash evidence which is the report is not filled correctly. As a researcher I was allowed to look at an empty crash report, but I was not allowed to take any copies, nor pictures. I found that filling the crash report form is an extremely tedious process even for a literate individual, the form had a very small font and many lines to be filled in several pages. An illustrative drawing of the crash scene is required to be filled in the report. The MoI official adds:

Reading crash reports is a tormenting process, the handwriting, the spelling mistakes, the unclear crash illustrations, the empty lines, all this and more make many of those crash reports faulty. If we have the budget, it would be so much better for all of us if trustees used cameras and CADs for crash reports instead.

(MoI official, personal communication, December 2017)

He explains that at the traffic department they struggle to read the handwriting of the filled crash reports, even if they were filled correctly. In many cases, it is difficult to understand the crash scene drawings because not everyone has the gift of drawing. Moreover, many crash reports have missing data including the illustration of the crash scenes which make them faulty reports meaning they are not added to the database. He explained that if they had a budget it would be easier to allocate cameras and CADs, which scan the ID and the driver's license and automatically input the data, to police trustees who report crash scenes. This would make the process of data recording much more efficient and provide video and photos evidence to the judge/insurance company documenting the crash scene in the cases of arbitration or reimbursement.

6.2 Unsafe Roads and Mobility

This section explains the process of road designs and construction and documents the current conditions of the road through a series of interviews and documented photos. The section is divided into two sub sections which are the design and road construction. Under design the Egyptian code for roads is explained, and the violations of the code are documented. Under road construction the poor conditions of roads are documented and the disorganization in road works stakeholders is discussed.

6.2.1 Design

Egypt has issued a code for roads since 1998, and it consists of 10 books. Each book is a detailed manual that mandates the steps required to execute its specialization. The code consists of the following ten books; (1) Preliminary studies of roads; (2) Traffic Studies (3) Engineering Design; (4) Road Materials and Tests; (5) Design and Construction of Bridges; (6) Structural Design of Roads; (7) Surface and Groundwater Drainage of Roads; (8) Road Construction Equipment; (9) Implementation requirements for road works inside and outside cities; and (10) Road Maintenance (Egyptian Code for Roads, 2016)

However, the code is very general, it includes the definition of several integration and separation concepts, but they are not as clear nor as defined like Vision Zero's road separation concepts which are explained in detail in the literature review chapter. Moreover, not all of the concepts are mentioned as mandatory but mere suggestions. The engineering design book discusses some concepts for protecting vulnerable road users and road separation. For instance, section, 4-5 in the Egyptian code for roads explains the importance of sidewalks in reducing pedestrian fatalities and injuries, while section, 4-8 defines the bikeway and gives general suggestions on how it can be used in normal roads and on highways, but neither their design nor their application are mentioned as mandatory in the code. Section, 4-15 explains how traffic barriers shall be used to protect road users from possible crashes, reduce the impact of the crash, and/or prevent vehicles from going off course. As for whether the code is applied or not, a private engineering consultant explains that it is not always present in real life applications in Egypt, noting:

Some roads and bridges in Egypt are perfectly designed and executed, while others are death roads. We have some new dangerous bridges like the one in Siddi Gabber [in Alexandria] which was recently opened. It has several faulty designs and very sharp turns without proper barriers to contain crash severity
(Private Consultant, personal communication, May 2018)

He explains that there is an inconsistency in the quality of road designs and executions in Egypt due to code violations in some cases. He gives an example of the dangerous design of a new bridge in Alexandria which did not fully adhere to the Egyptian code for roads.

Violating the code has resulted in preventable traffic crashes on the bridge.

Vulnerable Road Users

A few pedestrian crossings with some traffic lights can be seen in very limited places in Egypt, but there is no consistency in the road designs for pedestrian crossings. In many cases speed humps³ are used for calming the speed of the in-coming traffic at locations with a high volume of pedestrian crossings. Also, in some previously known blackspots where a lot of pedestrians were killed a costlier alternative is used which is a pedestrian bridge.

New Cairo is a new urban city which was established with a presidential decree in the year 2000 (New Urban Communities Authority, 2018). Yet, South 90 Street, the city's longest road, was designed without a single dedicated pedestrian crossing. In interviews with MoI officials in the city, and an ambulance personnel stationed in New Cairo they stated that per day they tend to one to three (1-3) pedestrian injuries in New Cairo. With the rise in the number of pedestrian injuries the government has been adding more speed humps along the road and is building a new pedestrian bridge at the beginning of the city as observed in the recorded videos and photos since 2017.

Figures 32-35 (See Appendix A) show how pedestrians dangerously cross the roads in New Cairo. The infrastructure of the city does not include a full pedestrian crossings design. As for using sidewalks in their daily commutes, pedestrians to use them since they are usually occupied by advertisement polls, street lights, trees, and/or road signs as shown in

³ A speed hump is wider and higher than a speed bump. Speed humps are commonly found on Egyptian roads, while speed bumps are usually found in Egypt inside gated communities such as residential compounds.

figures 36 and 37 (See Appendix A). Hence, pedestrians end up walking among cars since they cannot use the sidewalks.

6.2.2 Road Construction

The Egyptian General Authority for Roads, Bridges, and Land Transport which is under the Ministry of Transport is the one responsible for overlooking the road works and maintenance. During the interviews with government officials most of them indicated that the reasons behind the code violations are either due to budget cuts due to the lack of funding, or in some other cases it is the absence of monitoring and evaluation. For instance, one official indicated that speed humps, which are widely used in Egypt as an alternative to pedestrian crossings, are usually installed by workers in the absence of knowledgeable engineers and therefore are not installed according to standards, and in some cases are illegally installed without a permit by residents who aim to reduce the speed around their residential area. Moreover, he indicated that the paint used to label speed humps is a cheap type of paint which is usually used for doors not the paint used for marking the road because the original paint is costly. The cheap paint fades quickly due to the friction with car tires and the ease of its absorption by the asphalt. Figure 38 (See Appendix A) shows a speed hump which was constructed in the summer of 2018, and only a couple of months later its paint almost completely wore off while the paint stayed in perfect condition around the edge of the sidewalk where there is no car tires friction. This is due to the use of lacquer paint, which is used for doors and walls, instead of the specialized thermoplastic road marking paint which could withstand tires friction. The lacquer paint is frequently used instead due to its much lower cost compared to the high cost of the thermoplastic road marking paint (Senior MoI official, personal communication, October 2017).

Figures 39-41 (See Appendix A) show a Member of the Parliament (MP) lifting parts of a newly paved road in ALBehera governorate using only his bare hands. These images were taken from dmc TV's morning show 8 am hosted by Ramy Radwan who mentioned that the road has been only paved for 8 days prior to these images (Radwan, 2018). The MP recorded a video to reflect on the amount of road works corruption in the absence of adequate monitoring and evaluation. The road works contractor did not carry the basic codes and measures of road pavements.

Furthermore, the problem of poor enforcement negatively affects the conditions of the roads in Egypt. A study (Bekheet, 2014) indicated that in recent years in Alexandria there has been a noticeable premature failure in roads within only 3-5 years of their construction. The study explained that in recent years there has been an increase in illegally building speed humps without obtaining permits which has resulted in negatively affecting the roads. In addition to the speed humps an engineering consultant explained that the overloaded trucks as the ones displayed in the figures above, play a big role in destroying the roads in Egypt, especially in new cities where construction is an ongoing activity. He notes:

Constructing new roads and maintaining old ones in the absence of law enforcement is like throwing away your money in the Nile. These overloaded trucks will destroy the roads soon after they are finished.
(private engineering consultant, personal communication, January 2018)

He explains that the road conditions are directly correlated with traffic law enforcement. If traffic law does not exist there is no point in spending money on paving roads because the roads will shortly be destroyed by the overloaded trucks.

Maintenance

The absence of leadership in the road safety management has resulted in the lack of coordination among government bodies in multisectoral and intersectoral activities like road

works. The activities that fall under road works are not aligned among different government bodies and result in poor road conditions that need frequent maintenance. A private engineering consultant highlights the matter noting:

Who is responsible for the conditions of the road? If we breakdown the government bodies involved in road works, people will understand that the biggest enemy of the road is the lack of coordination among government bodies [...] Road maintenance is a waste of money if there is no coordination among government stakeholders.
(Private engineering consultant, personal communication, January 2018)

The consultant breaks down the parties involved in road works by explaining that officially the Ministry of Transportation's Roads and Bridges Authority is responsible for paving the roads and road maintenance, and the local government is also involved. While, the Ministry of Communications and Information Technology is responsible for extending landlines and the internet's fiber optics cables in the ground. As for the Ministry of Housing, Utilities & Urban Communities it is responsible for the pipes for fresh water and waste water also in the ground. The Ministry of Electricity is responsible for the underground electricity networks as well. In addition to the Ministry of Petroleum who is responsible for extending underground gas lines. Hence, if all these road work activities including placement and maintenance are not aligned all together in a reasonable schedule the newly paved roads will continue to be damaged after their maintenance, which is the case in Egypt. The lack of coordination does not only result in the poor conditions of Egyptian roads, but it is a waste of the huge road maintenance budget.

Figures 40 and 41 (See Appendix A) document the road maintenance of North 90 Street road in New Cairo in April 2018. Figure 42 (See Appendix A) shows the result of the newly paved and maintained North 90 Street in August 2018. While figures 42-47 (See Appendix A) show how this newly paved road was shortly destroyed after in October 2018. New underground pipes were installed after the road was paved not before it. This reflects the magnitude of the government waste of resources and the money lost due to the lack of

coordination among government stakeholders. Other roads in New Cairo were observed and they were also damaged shortly after their maintenance when fiber optics cables were extended.

6.3 Dangerous Vehicles

The World Forum for Harmonization for Vehicle Regulations (WP.29) is a worldwide regulatory forum to the automotive sector and administers three multilateral UN agreements for technical prescriptions and specifications for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles. However, in developing countries consumers are very price sensitive, and there are no stringent safety vehicle laws like the ones set in the developed countries. Hence, many car manufacturers targeting markets in the developing countries do not add similar safety features to the European ones for example (BS, 2014).

Although Egypt is contracted to one of the three UN Vehicle Regulations Agreements, Egypt does not have a clear mandate for vehicle safety standards in place (Glukhenkiy, 2017). For example, many of the vehicles on the road and even the newly manufactured vehicles sold in the Egyptian market lack main safety features. Vehicle suppliers import cars without these basic safety features in order to have an attractive market price. There are no laws restricting them from importing cars without ABS or even airbags. Tables 5-7 show the car specifications of some of the most recent 2019 car models available in the Egyptian market. These models lack fundamental vehicle safety standards such as airbags for drivers, airbags for front passengers, and/or ABS Brake Systems.

Table 5: Chevrolet Lanos 2019

Specs	M/T F/O 1.5
Gear	Manual
Type	Sedan
Engine power (Horse Power/ roll/min)	86/5800
Airbags for driver	<u>No</u>
Airbags for front passenger	<u>No</u>

ABS Brake System	<u>No</u>
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Source: Contact Cars Egypt, 2019

Table 6: Cherry Envy 2019

Specs	M/T Tinted Glass 1.5
Gear	Manual
Type	Sedan
Engine power (Horse Power/ roll/min)	109/6000
Airbags for driver	<u>No</u>
Airbags for front passenger	<u>No</u>
ABS Brake System	Yes

Source: Contact Cars Egypt, 2019

Table 7: Hyundai Verna 2019

Specs	M/T GL 1.6
Gear	Manual
Type	Sedan
Engine power (Horse Power/ roll/min)	106/5800
Airbags for driver	<u>No</u>
Airbags for front passenger	<u>No</u>
ABS Brake System	<u>No</u>

Source: Contact Cars Egypt, 2019

6.4 Unsafe Road Users Behavior

This section discusses the current violations of the road users which put them and others at a high risk of injury. Moreover, it explores why Egypt has lenient sentences for killer drivers in the Egyptian law.

6.4.1 Speed

Speeding is a common phenomenon on Egyptian roads, it has a strong cultural presence. For instance, a common practice associated with Egyptian weddings is called *Cars Zaffa*, where a fleet of cars surrounds the car of the bride and groom and practice several speeding stunts on busy roads. *Cars Zaffas* claimed the lives of several Egyptians like the three young medical students in 2016 when a young reckless *Car Zaffa* driver ran the three girls over killing them all (Alhosary, 2016). There are many catastrophes related to *Cars Zaffas* in Egypt, yet this practice is not criminalized by law. The act of speeding is, but the dangerous act of speeding by a fleet of cars intentionally performing *Cars Zaffas* speeding stunts is not particularly criminalized. Hence, any death caused by the dangerous voluntary speeding associated with this act is ruled as an unintentional mistake ie. an accident, which has a lenient involuntary manslaughter sentence.

Moreover, the act of car racing is commonly seen on Egyptian roads, yet it is also not particularly criminalized in the Egyptian law, only the act of speeding is. In 2016 a catastrophic car racing crash resulted in the death and injury of 15 young people in Heliopolis, Cairo. A racing car spun out of control crashing into pedestrians and vulnerable road users surrounding the area of the crash scene. The driver was excessively speeding which resulted in a severe crash to the extent that some of the victims' bodies were decapitated in the aftermath which was aired on Dream TV channel (El-Ebrashy, 2016). In 2017 AUC lost one of its most beloved students, Nour Anwar, when an underaged and unlicensed driver killed Nour a few km away from AUC when he was car racing with other

cars on South 90 Street in New Cairo. His speeding resulted in his car flying and landing on top of the car she was a passenger in. The car transporting Nour was severely damaged after the crash (Sobhy, 2017). Nour lost her life because of a selfish act of a reckless racing unlicensed driver yet the Egyptian law treats all killer drivers as involuntary killers, and their acts as mere accidents. The lenient sentences of killer drivers can be as low as 6 months with a sentence suspension.

6.4.2 Seatbelts, child-restraints, and helmets

The practice of wearing a seatbelt while driving in Egypt is uncommon, while child restraints is nearly an inexistent practice except among a few. A study carried on three major roads in Egypt showed the majority of drivers and front seat passengers did not wear seatbelts (Hoe et al., 2013). The study also showed a low child restraint range of 1.1-3.9%. Another study surveyed 486 families of injured children admitted to the emergency department at a hospital in Ismailia showed that only 2.7% of them used seatbelts, and only 0.8% used child restraints (El-Sayed et al., 2012). A crash victim interviewee explained that most of her friends do not use car seats for their children, and the children include newborns who are usually seated on the lap of the mother or another occupant while in the car. She was involved in a serious crash accident since she has been keen to put her newborn baby in a car seat. However, she explains that not everyone does that and recalls the loss of her colleague's toddler in a crash, noting:

I always use a car seat for my son, because one of my work colleagues lost her unrestrained one-and-a-half-year-old baby boy in a crash on the ring road. His body flew out of the car upon impact. Yet, most of my friends don't use car seats for their babies, and they don't even know how they are fixated in the car. They don't even use seatbelts for the older ones [children].

(A crash victim, personal communication, July 2017)

She explains that the majority of her friends with children don't use car seats, and they don't even know how one is installed. When she rides with them in their cars and brings her baby's

car seat, they don't know how to strap the seatbelt around it. When she was asked about whether they can afford a car seat she answered:

Of course, they can afford buying one, I am talking about people from a good financial and social level. Money is not the issue; it is just uncommon here in Egypt to restraint children. People don't realize its importance.

(A crash victim, personal communication, July 2017)

She argues that buying and using a car seat is not correlated with financial nor social status. It is only an uncommon practice in Egypt due to the lack of awareness in the society. People don't appreciate the importance of car seats in keeping their children safe.

During field observations a small number of private cars were noticed to use car seats for their children while the majority did not; moreover, some baby car seats were found to be placed dangerously in the passenger's seat next to the driving mother on several occasions. Some other children were seated on the lap of the drivers and front seat passengers. The majority of the observed vehicles with children did not adhere to the standards of child passenger safety such as car seats, seatbelts and helmets. In addition, some children were placed in dangerous positions as seen in figures 42-46 (See Appendix A)

Egypt has witnessed a series of tragic deaths of school children during their school commute. The recent tragedy of Malika, a 3-year-old child who was run over by her school bus upon being dropped off to her house has caused a wide debate on social media platforms. Her parents shared the footage obtained from a camera in their neighborhood showing how the small child was left alone to exit the bus and because she was tiny she did not show in the blind spot in the right front corner of the bus when the driver ran her over (Samir, 2019). Malika's story got a wide coverage on social media because of the video; however, there are several other stories in Egypt involving the death of young school children underneath their school buses which are reported in Egyptian newspapers. Moreover, the injury of 60 school children from which 47 have died in 2012 when their school bus was crushed by a train shook the Egyptian society (Talaat, 2012). However, very little action was taken ever since to monitor the state of the bus drivers, the school bus routes, and maintain the needed measures of road safety for school children.

As for adults the number of adults using seatbelts or helmets were also very small. The act of loading humans on the back of opened vehicles such as pickup trucks and tricycles was frequently observed, especially among the lower social and economic class in Egypt. It was also particularly high among construction workers, but it was also observed among traffic police guards as shown in figures 47-51 (See Appendix A).

6.4.3 Driving Under the Influence

The Minister of Social Solidarity, Ghada Wally, highlighted the serious problem of substance abuse in Egypt in several televised interviews stating that it is double the global average (CBC, 2018). No academic research on the relationship between road fatalities and injuries in Egypt and driving under the influence have been found, nor was there any published statistics on the subject, yet there are some common indicators showing that there is a prominent substance abuse problem among truck drivers involved in fatal crashes. In 2013, a drugged truck driver claimed the lives of 8 students, their principal and their bus driver when he crashed into them on the Ring Road. In 2014, a crash claimed the lives of 18 school students whose bodies were burned in the collision flames due to a drugged truck driver who crashed into their school bus in ElBehera governorate (AlWaqie, 2014). In 2016, a drugged driver killed the daughter of one of this research interviewees after crashing into their car. Hence in a bid to understand why drugs are prevailing among truck drivers an interview with a truck driver was conducted. He explained that due to the long working hours many truck drivers take drugs to stay awake. He does not take any drugs, but he worries that he would fall asleep while driving someday:

“My job entails that I drive back and forth for long hours and I am a human being who needs to rest... There are rest stops for trucks on the highways, but they are completely disserted, and several drivers have been mugged when they stopped there to rest/sleep. When I rest on the side of a busy lit highway spot at night to avoid being mugged, police officers fined

me, and I got in trouble. I don't want to take drugs and I don't do them, but this is why many truck drivers take drugs. To stay awake, and work longer hours without resting, and to make more money of course”
(A truck driver, personal communication, August 2017)

The driver explains that he is faced with the dilemma of either getting mugged at a rest stop, getting fined if he pulls over on a busy lit highway to rest, or driving for long hours non-stop even if he risks falling asleep while driving. He explains that some of the truck drivers solve this dilemma by using drugs to keep them awake to work for longer hours without resting. Driving for long hours without resting also means they can get more work done, which is more profitable as he explains.

A MoI official explains that in Egypt there is no system to regulate the service hours of truck drivers. He benchmarks law enforcement tools in the EU, noting:

In the EU there are tachographs to monitor the hours driven and the speed of truck drivers, and there are very strict laws. In Egypt there is no system which we can use to monitor how many hours a truck driver has been driving.
(MoI official, personal communication, September 2017)

A tachograph is a device which can be installed in the vehicle to record the driving, speed, rest and break periods of the driver. Each driver has his own card which has all of his data, the driver then inserts his tacho card when on work duty (Department for Transport, n.d.). Since 2006 tachographs have been digitized and they include printers to print out detailed receipts for road side inspections. It is mandatory in the EU to install a digital tachograph on vehicles with a mass of 3.5 tons for goods transport, and for vehicles with more than 9 passengers including drivers for passenger transports (European Commission, n.d.).

Talk shows in the Egyptian media highlighted the problem of drugged truck drivers for years because they have caused many tragic accidents, However, driving under the influence isn't just limited to truck drivers, but also smaller vehicles drivers such as minibuses, taxis and private cars. A crash victim recalled when his car was hit by a drugged minibus driver on 6 of October bridge in Cairo, stating:

When I went down to check the damages, the microbus driver also went out of his microbus. I was fuming, I could not even comprehend how he hit my car. Then when I approached him, I noticed that he was in a complete state of intoxication. His eyes were so red, and he couldn't even stand straight.

(A crash victim, personal communication, February 2018)

The crash victim went out of his car to check the crash damages caused by the microbus driver to his car. He was very angry and he wanted to argue with the microbus driver because the crash was completely avoidable. However, when he went to approach the microbus driver, he discovered that he was in a complete state of intoxication to the extent that he could not even stand up straight let alone drive a microbus on the longest bridge in Egypt, 6 of October bridge. Another crash victim explained the details of a crash which he miraculously escaped. While he was driving on the ring road across a hotel, a large SUV suddenly hit one of the side barricades and flipped multiple times and landed in the middle of the ring road diagonally dangerously obstructing the traffic, when he rushed out of his car to help the driver he noticed the following:

It was 2.30 am [...] There was blood gushing out from his forehead, and he wouldn't even realize it. His breath was horrible, because he was extremely drunk. When I asked him to unlock his phone and call a family member, he could not even do it. Thank God nothing happened to me or the other cars.

(Crash victim, personal communication, June 2017)

The crash victim was so close to crashing his car into the drunk SUV driver, but he luckily was able to break along with the other cars on the road. The drunk driver was driving late at night in a full state of intoxication. He could not even comprehend the harm his body endured nor follow simple instructions such as dialing the number of a family member to come to his aid.

6.4.4 Jaywalking

Many pedestrians in Egypt cross the roads dangerously due to the lack of adequate pedestrian crossings. However, a crash victim explained in an interview that some pedestrians are harmed because of jaywalking even if there are pedestrians crossing noting:

When I was driving on Cairo-Alexandria highway I saw something in the middle of the street I didn't know what it was until I saw the body of a dead young man in the middle of the highway. It was a horrific scene, he died trying to cross the highway although there was a pedestrian bridge a few meters away
(Crash victim, personal communication, 2018)

He recalls the horrific crash scene and indicates that the death of the young man could have been avoided if he would have used the pedestrian bridge which was nearby. Figure 58 (See Appendix A) shows two men on the left dangerously trying to cross Suez road right underneath a pedestrian bridge, while a man in the top right is safely using the bridge to cross. This is definitely a dangerous act; however, one of the interviewed engineering consultants argued that the use of pedestrian bridges in Egypt is challenging to senior pedestrians, mothers with strollers, people with knee injuries for example. Hence, elevators and escalators should be installed for maximum effective use of pedestrian bridges.

6.4.5 Lenient Sentences for Killer Drivers

Some of the crash victims who lost their loved ones expressed their dissatisfaction of the lenient killer drivers' sentences in Egypt. They argued that lenient punishments would not make drivers fear the consequences of traffic violations. The Egyptian law treats any motor vehicle crash as a mistake, or what is more commonly referred to in the Egyptian context, an accident, irrespective of the state of the killer driver. The sentence for killer drivers in the Egyptian law is treated as involuntary manslaughter which can be as low as six months and a one hundred Egyptian pounds as mandated in article 238 and 244 from the penal code (See Appendix B).

A crash victim explained that in the case of her daughter's death the judge was very understanding and compassionate, but he could not give a serious sentence to her daughter's DUI killer because the law restricted him, she explains:

As long as he [killer driver] did not have a predetermination to kill my daughter before leaving his house then this means that it was unintentional

accident according to the Egyptian law, and he gets a minimum sentence of involuntary manslaughter. Although he intentionally consumed drugs and the tests proved it, he was speeding like a maniac with a heavy truck on the ring road, and he intentionally hit us more than once to detach the body of our car from his and escape. The judge was very decent, and he wanted to help us but the law in front of him did not give him the space to give the killer the sentence he deserved. The killer got only a three-year sentence and a fine.

(A crash victim, personal communication, November 2017)

The judge was able to see the suffering of the mother and sympathize with her emotional state after losing her daughter. However, the Egyptian penal code did not give the judge the room to give the killer driver a serious sentence. According to the law if the killer driver did not have a predetermined plan and intention to go down and kill that specific child by name then the case is treated as involuntary manslaughter regardless of the predetermination of substance abuse. Hence, the drugged and speeding killer truck driver got a lenient sentence for killing a child.

There are two articles in the Egyptian law discussing involuntary manslaughter specifically in the case of causing death by driving which is interpreted as causing death by mistake. Articles 238 and 241 of the Penal Code in the Egyptian law are as follows:

Article 238 of the Penal Code:

Whoever caused a mistake in the death of another person if that was due to negligence or incompetence or lack of care or not to comply with laws, decrees, regulations and regulations shall be punished by imprisonment for a period of not less than six months and a fine not exceeding two hundred pounds or one of these penalties. The penalty shall be imprisonment for a period of not less than one year and not more than five years and a fine not less than one hundred pounds and not exceeding five hundred pounds or one of these two penalties if the crime is committed as a result of a serious breach of the duty imposed by the offender on the basis of the job mandate or profession or craft or if the perpetrator was under the influence of alcohol or drugs when the mistake happened which has resulted in an accident or if the perpetrator did not provide assistance while they can to the victims at the time of the accident. The penalty shall be imprisonment for a period of not less than one year and not more than seven years if the act results in the death of more than three persons. If there is another circumstance mentioned in the preceding paragraph were satisfied, the penalty shall be imprisonment for a period of not less than one year and not exceeding ten years.

Article 244 of the Penal Code:

Whoever caused a mistake in injuring a person or injuring him if that was due to negligence, recklessness, lack of care or failure to comply with the laws, decrees, rules and regulations shall be liable to imprisonment for a period not exceeding one year and a fine not exceeding two hundred pounds. The penalty shall be imprisonment for a period of not more than two years and a fine not exceeding three hundred pounds or one of these penalties if the injury results in permanent disability or if the crime occurred as a result of serious breach of duty by the offender as imposed by his job mandate or profession or his craft or was drunk or drugged when they committed the error which resulted in the incident or did not at the time of the incident help those the crime were committed against given that the perpetrator had the ability to help. The penalty shall be imprisonment if the crime results in the injury of more than three persons. If there is another circumstance in the preceding paragraph, the penalty shall be imprisonment for not less than one year and not more than five years

The Egyptian law under article 238 has named four offense leading to involuntary manslaughter, which are: (1) negligence; (2) carelessness; (3) recklessness; and (4) non-observance of laws and regulations; however, these four identified offenses still have the same penalty range. Article 244 treats death by driving as an error, and if a killer driver was proven to be drunk or drugged when they committed the error their penalty shall not be more than two years imprisonment and a fine not exceeding three hundred pounds. If a killer driver caused the death of more than three persons, then the penalty shall be imprisonment for not less than one year and not more than five years.

Many leading countries in Road Safety have more stringent laws against DUIs and Speeding and killer drivers.

To understand why Egypt has lenient killer drivers' laws an interview was conducted with a law professor. When asked about why the laws are that lenient, she explained:

The legal system simply does not trust the documentation of events which could unjustly convict an innocent man. The law in Egypt prioritizes the innocents over the felons. We have a serious problem in road safety management and crash reports and law makers know that very well. What

if people who honestly made a mistake while driving were unjustly reported as drunk, drugged or speeding drivers. What if they did not even make any mistakes and a pedestrian wrongly crossed the road for instance, but the driver still gets falsely convicted. I am not saying the law is right or wrong, but it prioritizes not convicting the perhaps innocent killer drivers more than convicting the dangerous killer drivers.
(A law professor, personal communication, September 2018)

The professor explains that the law makers in Egypt do not believe in the poor road management system conditions. They do not trust that the crash reports, which are manually filled by some illiterate police trustees, to convict a killer driver. Hence the law does not specify stringent sentences for killer drivers to avoid convicting innocent driver or drivers who honestly made a mistake while not being under the influence or speeding. The law makers give priority to the innocents when drafting the law over convicting the felons.

6.5 Post-Crash Response

In case of the failure of the previous four pillars of road safety, the fifth pillar, post-crash response can still save a human life or decrease the severity of an injury. The literature review covered the significance of a time sensitive response and the availability of trauma centers in saving lives. Hence this section divides its findings into two subsections, ambulance response and access to trauma care to explore the conditions of the current post-crash response in Egypt.

6.5.1 Ambulance Response

An interview with crash victim survivor indicated that there is a problem in the ambulance response, and medical professionalism in handling the road injuries, noting:

My friend and I got into a horrible car crash on Road 90 in New Cairo. It happened at 9.30 but the ambulance at 11am. We were in a critical condition, my friend's backbone was fractured, and she was completely unconscious, while I sustained several fractured ribs and a punctured lung [...]. Yet when the ambulance personnel arrived, they did not mind our injuries and we were semi thrown on the stretchers.
(A crash victim, personal communication, July 2017)

She explains that she and her friend sustained serious injuries from the car crash and needed immediate medical attention. The crash took place on a major road in New Cairo; however, the ambulance response time was very long. Moreover, the ambulance workers were not adequately trained to handle their critical condition.

To understand why an ambulance on a major road like 90 street would arrive an hour late to a crash scene, an interview was conducted with an ambulance personnel in New Cairo specifically. He highlighted a major problem in the ambulance service coverage, noting:

Our ambulance unit which is responsible for all the accidents that occur in the area of Katameya also serves the whole stretch of road 90 in New Cairo, because there isn't a single ambulance unit on the 10+km stretch of South 90 Street. So first it takes us awhile to get to the location, especially if there is a rush hour. Second if there is more than one accident or a medical emergency within this vast area to cover we get delayed, and it does happen.
(An ambulance worker, personal communication, August 2017)

According to the ambulance working the problem of the delay in the response time is related to ambulance allocation. He explains that it is not right to have more than a ten kilometer stretch of a major busy road like South 90 Street, and not have any ambulance units serving it. The possibility of more than one accident or medical case that needs attention occurring simultaneously can further affect the response time of the ambulance in New Cairo.

6.5.2 Access to Trauma Centers

In 2014, the government of the former Egyptian Prime Minister, Ibrahim Roshdy Mahlab, issued a set of new laws and regulation binding hospitals to admit emergency cases such as crash injuries. Previously, the law mandated a free emergency admission for 24 hours, but Mahlab's new law extended it to 48 hours (See Appendix B). In return the Ministry of Health is supposed to reimburse the hospitals (Eldemrany, 2014). However, Eldemrany's interviewee, Dr. Ahmed Hussein, member of the Board of the General Union of Physicians, argued that this law is just ink on paper because the government does not have the finances to payback the hospitals for the cost of these emergency admissions.

Dr. Hussein doubt from 2014 were proved correct with time. There has been a wide debate in the media and the society regarding the application of the 48 hours emergency law after several reports of hospitals refusing to admit emergency patients. In some other cases the hospitals would admit the patient to avoid legal problems and immediately release them back irrespective of their medical condition to avoid the costs of their treatments. One of the crash victims explains her experience with the ER at a public hospital noting:

After the ambulance admitted us to a public hospital, all the hospital did was give my friend and I Voltaren, which numbed the pain and then they immediately discharged us. They did not do any X-rays or anything. Shortly after we were discharged the numbing was over and we suffered

excruciating pain. When we were admitted to another hospital the doctors did an X-ray to discover that my friend's injury was a broken back and I suffered several fractured ribs and a punctured lung. The doctors told us that our injuries are probably worse because we moved around when we were numbed with the Voltaren.

(A crash victim, personal communication, July 2017)

Voltaren shots are a strong pain relief treatment which numbs the pain resulting from an injury but does not treat its cause. At the hospital where the ambulance dropped off the two victims, they did not receive the necessary emergency treatments. The hospital avoided the cost of their treatment through numbing their serious injuries to be able discharge them from the hospital as quickly as possible. When they were later admitted to another hospital on their families' own expense, the hospital carried out all the required procedures to assess their medical condition including X-rays. The X-rays showed that the two victims suffered from serious injuries when, and one of the doctors indicated that perhaps their condition got worse because they exerted a physical effort and moved around when their bodies were numbed by the Voltaren which they took at the previous hospital.

Interviews with an ambulance worker, a private hospital manager, a government official at the Ministry of Health were conducted to shed some insights on the current conditions and investigate the ongoing problem of the 48 hours emergency law further.

An ambulance worker explained that within the area of his service there is a high injury rate of nearly one to three crashes per day, many of which are usually critically injured pedestrians trying to cross a five-lane highway to reach their workplaces. He adds that there are no public hospitals near his deployment area and the private hospitals don't usually comply with the 48 hours law and refuse the entry of the ambulance inside the hospital, noting:

There are no public hospitals within my area of service, so I have to drive at least 15-20 km to reach the nearest public hospital that is equipped for emergency cases... This can be very dangerous for the victims, especially if they have a head injury. Within the 5 km geographical range of my service there is only one hospital and it is private.

(An ambulance worker, personal communication, October 2017)

The Minister of Health issued Decree No. 445 of 2014, on the executive rules of the Prime Minister's Decree No. 1063 of 2014 to treat citizens in cases of emergency and injuries during the first 48 hours free of charge, in all hospitals. Article no.4 of Decree No.455 of 2014 mandates that ambulance cars are obliged to transfer emergency cases to public hospitals within five (5) kilometers from the geographical location of the accident first. In case there were no public hospitals within the specified range, then the ambulance transfers the emergency case to the nearest private hospital for emergency treatment. The ambulance driver explained that there are no public hospitals within the specified five kilometers range in his area of coverage. Yet private hospitals in his range refuse the admission of emergency patients; hence, he usually has to transfer the emergency cases to a public hospital and the nearest one to his area of service which is 15-20 kilometers away. The ambulance driver explained that in the city of New Cairo there are no available public trauma centers, hence if any crash occurs the ambulance has to drive the victims to AL Bank AL Ahli hospital on the Ring Road which is considerably a far distance if the injuries of the victims are critical. If the victim is conscious and s/he has a medical insurance and can finance their admission to a private hospital, then the ambulance can notify the private trauma center in New Cairo and admit them.

A private hospital doctor argues that the 48 hours emergency law is inapplicable because private hospitals will go bankrupt if they apply it noting:

When the law first came out, the private hospitals did not object and complied with admitting emergency patients, but with the accumulation of the unsettled bills, we realized that we will go bankrupt if we continue. For example, we have had emergency admissions for crash victims under the 48 hours law, but some would stay in the ICU for more than a month not just 48 hours. Most of the cases cannot afford to pay for their treatment costs, and we cannot discharge ICU patients because once they are admitted inside the hospital they become a legal responsibility if they die. (A hospital manager, personal communication, January 2018)

The private hospital manager explains that the accumulated unpaid bills has caused a deficit in the budget of many private hospitals because the government did not reimburse them. Some crash victims who sustained life threatening injuries had to be admitted to the Intensive Care Unit for long durations not just 48 hours. He explained that once an emergency patient is admitted inside the hospital, s/he become a legal responsibility and cannot transfer to other hospitals before several weeks until their condition is stable. Also, Article 2 and Article 9 mandate that emergency patients should not be transferred from one hospital to another before their condition is stable, and their transfer is approved by the central emergency and local units. Hence the bill goes way beyond just 48 hours, given that many of these victims' families are not financially capable, and there are no laws mandating that the government will pay anything beyond the 48 hours. Not to mention, that there is a struggle to get reimbursed for the 48 hours in the first place. Hence, private hospitals started turning ambulance cars away. He explains that in some cases, hospitals try avoiding conflicts with the government, so they accept emergency patients; however, they shortly dismiss them afterwards regardless of their medical condition:

For instance, a road traffic crash victim can be suffering internal bleeding- which is very serious, the hospital would just stitch him/her up and dismiss them without the needed tests, or X-rays to avoid high costs.... Now I am talking about both private and public hospitals. Public hospitals also have budgets, and many suffer from huge deficits, and they don't usually get reimbursed as well.

(A hospital manager, personal communication, January 2018)

The hospital manager explains that there are different ways to go about the 48 hours law. Hospitals would not take the necessary emergency measures to properly diagnose the admitted emergency cases. This disregard is usually done to avoid high costs, because the government does not reimburse the hospitals irrespective of their nature, whether they are

public or private hospitals. Such loopholes in the method of application result in the failure of the 48 hours emergency law serving its purpose, which is saving the lives of emergency cases.

Chapter 7: Conclusion & Recommendations

The findings of this research show that none of the UN's road safety five pillars are successfully fulfilled in Egypt. A failure in the road safety management pillar seems to have had a domino effect on all the other four pillars. Based on the identified challenges, a set of Recommendations are drawn to enhance the road safety conditions in Egypt.

7.1 Conclusion

Government officials and private consultants, at key positions, have addressed the problematic absence of a road safety lead agency to manage and overlook the entire process of road safety in Egypt. Without this lead agency it is challenging to have a comprehensive road safety strategy with defined objectives through the complex operational and organizational structures of government stakeholders. Government stakeholders need to be managed with a clear strategy and measurable targets to follow through. They also need to be monitored and evaluated based on their performance and aligned on the same objectives since the road safety activities are multisectoral and intersectoral.

Moreover, the absence of a road safety lead agency has resulted in the failure of the execution of vital road safety activities, such as the addressed incomplete blackspots project in one of the interviews. It has also resulted in government waste of resources, such as the addressed halted projects and abandoned studies at the Ministry of Transportation, and the example of the out of service traffic lights in the city of New Cairo which insinuated deep corruption. The absence of a road safety lead agency has also resulted in the misallocation of the government's financial resources. There is a waste of the government resources on incomplete, halted, abandoned and uncoordinated projects, while concurrently there is a lack of funding problem across the traffic departments. In addition, the poor traffic law enforcement due to deeply rooted challenges in the traffic departments in Egypt have resulted

in alarming traffic violations such as the ones described by the interviewees and documented in the field observations (See Appendix A). The problem of the absence of a lead agency is cross cutting all the other four pillars.

For instance, there is a noticeable failure in the safe roads and mobility pillar, because of the lack of coordination among the different authorities involved in road works. The roads are either paved or maintained by the Ministry of Transportation, and damaged shortly after due to disorganization in schedule activities by other ministries involved in road works such as extending gas lines, fiber optics cables, water pipes maintenance, etc. Moreover, there is an inconsistency in the quality of road designs and construction due to the poor monitoring and evaluation of road works. The figures obtained from the Egyptian MP's video lifting parts of a newly constructed road with his bare hand show that there is a serious lack of monitoring, evaluation, and accountability. All this result in dangerous roads, and government waste of resources. As for venerable road users, the research findings show that the fundamentals of road designs in Egypt are far from the road separation design concepts of Sweden's Vision Zero. Egypt not only does not have the separation concepts of venerable road users, such as pedestrians, but does not have the coverage of basic pedestrian crossings. For instance, a complete traffic lights system at pedestrian crossings is not integrated within the country's road designs.

As for the safe vehicles pillar, the research shows that Egypt does not have the basic motor vehicle regulations such as airbags for drivers and front seat passengers. Moreover, there are no regulations mandating ABS nor ESC breaking systems. Hence, in the absence of such basic regulations, several motor vehicles suppliers supply the market with vehicles with poor safety standards. They are able to capitalize on profit and focus on the price sensitive market over providing fundamental vehicle safety features, which are more costly.

Regarding the safe road users pillar, the research shows that there is a noticeable lack of awareness among road users in Egypt. In the absence of road safety leadership there has been an absence of nationwide awareness campaigns to educate road user. The lack of awareness is not bound to specific financial or social class. Figures 48-52 (See Appendix A) show unrestrained children who are dangerously positioned in vehicles. Some of the children who are overloaded in the back of trucks, and motorcycles might reflect that the violations of child passenger safety measures are only bound to a poor social class. However, the figures show unrestrained and dangerously positioned children also in private cars. This reflects that the lack of awareness is found across different financial and social levels in Egypt. Moreover, the dangerous road user behavior shown in figure 25 also proves that there is a general lack of awareness when it comes to traffic safety measures irrespective of the drivers' financial status. The figure shows a Volvo SUV, which has a market price range above 1 million Egyptian pounds (Contact Cars, 2019), being driven in the opposite direction on a highway. The car's driver who could afford such an expensive car still lacked the sense of the implications of the dangerous violation he was committing.

The five pillars are based on the safe system approach to provide a wide support system to avoid the loss of life. Hence, in the case of failure of all the previous four pillars a life can still be saved, and an injury can be reduced if the fifth pillar, post-crash response is strong. Unfortunately, the research shows that the post-crash care system in Egypt faces hindering challenges which impedes its performance. The absence of leadership among the post-crash care stakeholders has also resulted in dangerous system failures. The problem of the limited ambulance coverage and the lack of adequate training among ambulance personals, were highlighted in the interviews. This shows that the process of saving a life or treating a severe crash injury could be challenging in Egypt. The study shows that both the ambulance and/or the trauma center systems face many challenges that hinder them from

handling crash victims appropriately. The poor coverage of ambulances, the lack of adequate training of ambulance personals, the loopholes in the 48 hours emergency law and the failure of the Ministry of Health to compensate hospitals for their services place many crash victims in life threatening situations where a preventable death or an avoidable long-term injury can occur.

7.2 Recommendations

The failure in the pillars of road safety management, safe roads and mobility, safe vehicles, safe road users, and the post-crash all have one trigger in common. That trigger is the absence of a road safety leadership, which in return has a series of dangerous reciprocating failures across the entire road safety system in Egypt. A national lead agency with legislative powers and jurisdictions must be included in the Egyptian law. The national lead agency shall have its own annual budget which should come from two sources. The first source is the country's national budget from which it will sustain its daily operations along with the operations of the traffic department. The second source should be from the total sum of the traffic tickets in Egypt which shall be allocated for the development of the operational activities of the agency and the road safety stakeholders. The agency shall be held accountable for the status of road safety in Egypt; hence, it needs a legislative authority to hold the involved stakeholders accountable. It shall have a long-term strategy with short- and long-term projects and activities. These projects and activities shall have clear objectives and measurable targets. However, in order to have a strategy with clear objectives and measurable targets, the agency needs to address the serious challenges found in this research.

Part of the crash data dilemma was a result of either the faulty crash reports reported by the unskilled police trustees, and in other cases the inaction to report the crash as some of the crash victims highlighted, hence the discrepancy in data between CAPMAS's reported crash injuries by the Ministry of Health versus the Ministry of Interior. Hence, the agency

needs to supplement the traffic departments with more skilled traffic enforcement personals. These skilled traffic enforcement personals can tend to crash scenes, regulate traffic on site, and report parking violations. This recommendation is inspired from the UK's Civil Enforcement Officers (CEOs) program. CEOs are selected people from the general public who receive training to become civil enforcement officers. Some of the work activities of the CEO's is to foot patrol the streets to ensure traffic regulations are being followed, record and issue ticket fines, report on the road conditions if there are any damages, identify and report stolen/ abandoned vehicles, work and coordinate with other police departments to report observed criminal activities (CASCAID, 2019). They are usually equipped with handheld CADs and printers to record and issue fines, two-way communicators to contact police officers, and cameras to record violations (Medway Council, 2019).

In the Egyptian context, the CEOs can carry out some of the work activities as in the UK and address to the specific challenges addressed in this study such as crash reports, patrolling. CEO's in Egypt can represent a more advanced visible traffic enforcement image to the public to reflect on the status of the rule of law. However, this recommendation does not eliminate the need of CCTV, and speed enforcement cameras in the 21st century in Egypt. The finance of such projects can be obtained by the lead agency from the ticket fines to further develop the tools of enforcement.

Moreover, the lead agency shall encourage road users to use public transport and decrease the use of personal vehicles. This will decrease congestion and increase the use of the 90% safer mode of transportation (public transport) compared to private transport (Litman, 2016). In this case public transport means public buses, and metros and not minibuses because they almost operate as private vehicles. However, in order to increase the use of public transport the agency needs to collaborate with the Ministry of Transportation to introduce new public transport projects with a wider coverage of good quality public

transport in Egypt. Once the infrastructure and the format of these projects exist, private investors will be more encouraged to join. Hence, the projects will be easily financed through models such as Public Private Partnership (PPT) projects, or Build Operate Transfer (BOT) projects which are found in several EU countries. Moreover, the agency needs to mandate and ensure the application of motor vehicle safety regulations, and it shall be done in coordination with the customs authority. The customs authority shall ensure that no new cars with poor traffic safety measures are cleared. Customs and taxes reduction incentives on cars with high safety features can also be used to motivate car dealers.

Egypt shall have safer road users through addressing the lack of awareness among all road users, and the adequate training of novice drivers. Nationwide campaigns should be carried out annually on the most visible marketing platforms such as billboard and on social media. These campaigns should target Egypt's most dominant problems in road safety violations. For instance, in the UK studies have found a noticeable rise in road crash fatalities and injuries particularly around the Christmas holiday season because of an increase in drunk driving violations. Nearly two decades ago the country introduced a nationwide campaign called THINK! Every year the campaign usually starts in December and ends on the 1st of Jan of the following year. THINK! has decreased road deaths in the UK by 46% (Think, 2019). Moreover, the Egyptian government should encourage the establishment of driving schools, and the law shall mandate attending a driving school before obtaining a driving license. The driving test centers should be monitored and evaluated to ensure that a driving license is only obtained after passing all the necessary driving tests.

As for Egypt's crash data, CAPMAS is a great source of data collection, the data dilemma was not caused by CAPMAS, but by the sources from which CAPMAS had obtained the data. Hence, after addressing the root causes of the under reported data, the lead agency should collaborate with CAPMAS to observe crash trends from which it can

draw campaign objectives. Once there are clear problems, and perhaps specific dates such as in the example of the UK, the lead agency should launch road safety nationwide campaigns with clear objectives and targets. Then with the help of CAPMAS and traffic departments it can evaluate the effect of the recommended annual awareness campaigns.

Furthermore, the lead agency needs to collaborate with the Ministry of Education and the Ministry of Higher Education to establish a specialized road safety department within each ministry. Road Traffic injuries are the leading cause of death among children aged 5-14 (WHO, 2018). Children usually spend their time on the road commuting back and forth to schools. The job of this department shall be focused on enhancing the level of student's road safety during their school/university commutes. Whether the students use school/university buses, public transport, or private motor vehicles for their commute. The department should play a positive role in saving their lives. Students should be educated in schools about road safety measures. For the younger students their education can involve some road safety activities to be carried with their parents to increase the level of awareness in their households.

Moreover, the road safety department in collaboration with the lead agency and the traffic department shall carry out drug tests among their bus drivers on regular basis. Moreover, the bus areas and students pick up and drop off areas should have safety regulations in all the schools and universities to ensure students safety. Yara's death, a 19-year-old student at the German University in 2015 has caused a university strike and a wide anger among the students who noted that the bus driver who accidentally killed Yara was not the only one at fault but rather the university's transport department which had poor safety regulations (Allam, 2015). Similar death scenarios like Yara's and the 3-year-old Malika must be prevented.

Finally, in order to save lives on the road from dangerous and/or reckless killer drivers all road drivers must know that there are implications to their actions; hence, it is important to hold killer drivers accountable. The interviewed law professor argued that the law makers in Egypt did not create harsh killer driver laws because of the poor conditions of road safety management and their mistrust in crash reports. Hence, the lead agency needs to first ensure the rule of law, and the enhancement of crash reports through the suggested policy recommendations, then it should immediately tend to adjust the killer driver laws in cooperation with the Egyptian government and the parliament.

The UK can then be used as a benchmark for the new law adjustments, because the law sentences for causing death by driving is categorized in more details in the British context compared to the Egyptian context which identifies all killer drivers, irrespective of their violation, as people who made a mistake. For example, The British Road Traffic Act 1988 has divided the offense of causing death by driving into four different offenses. They are as follows; (1) causing death by dangerous driving; (2) causing death by careless driving while under the influence of alcohol or drugs; (3) causing death by careless or inconsiderate driving; and (4) causing death by driving: unlicensed, disqualified or uninsured drivers. While in some cases careless and inconsiderate driving can be borderline with dangerous driving, each offense is described differently. Dangerous driving can encompass multiple offenses such as deliberately driving beyond the speed limit, consumption of large amounts of alcohol and/or drugs to gross impairment, driving unmaintained vehicle, disregard to vulnerable road users, and/or dangerous maneuvers. As for careless and inconsiderate driving, the offenses can encompass short distractions, driving through a red light, inappropriate overtaking, flashing lights, and or misuse of lanes. Dangerous driving has three levels of seriousness with three difference sentencing ranges accordingly. Causing deaths by

dangerous driving sentences and causing deaths under the influence can result in sentences up to 14 years, while careless driving only has a maximum of 5 years (SGC, 2008)

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APPENDIX A (Figures):

Figure 1: Probability of Death vs. Impact Speed in km/h

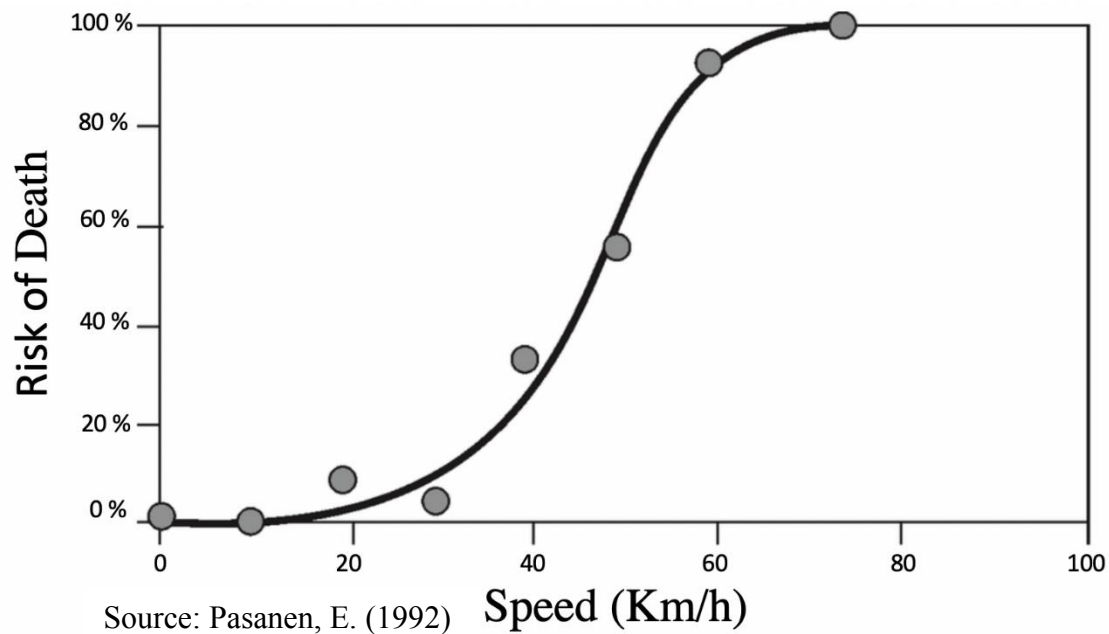
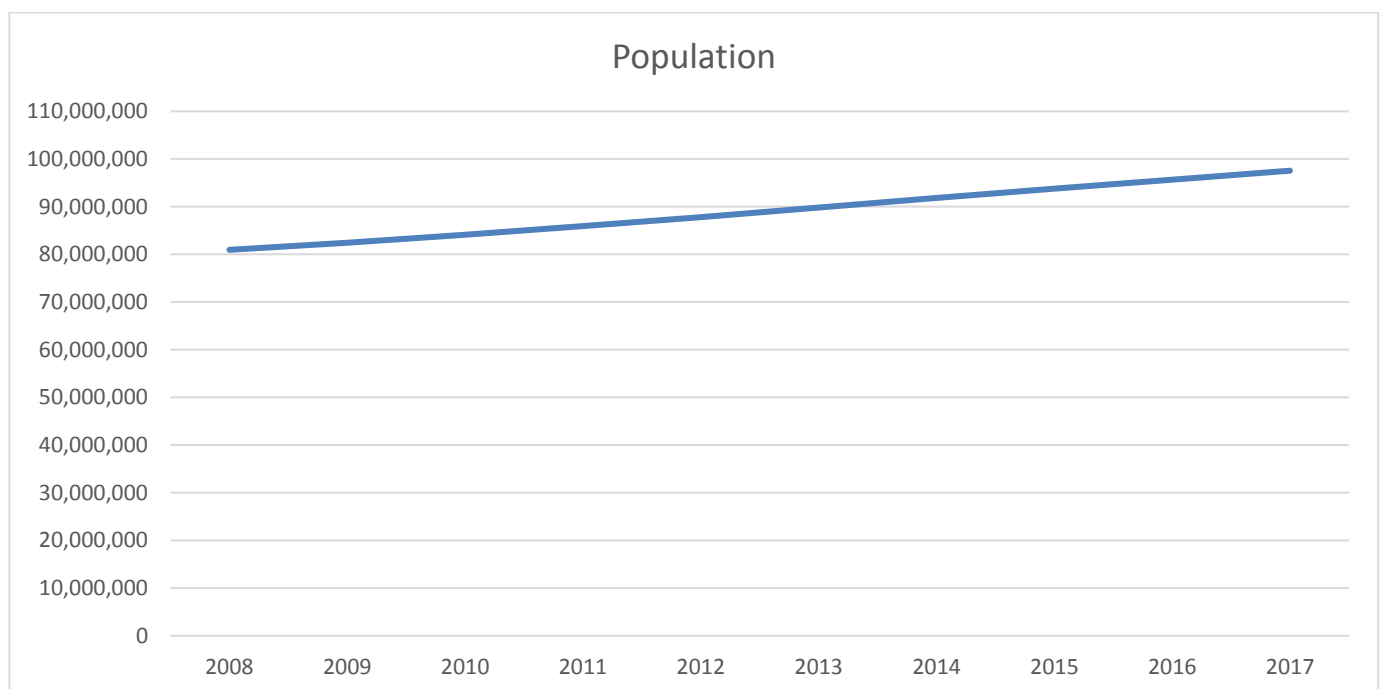
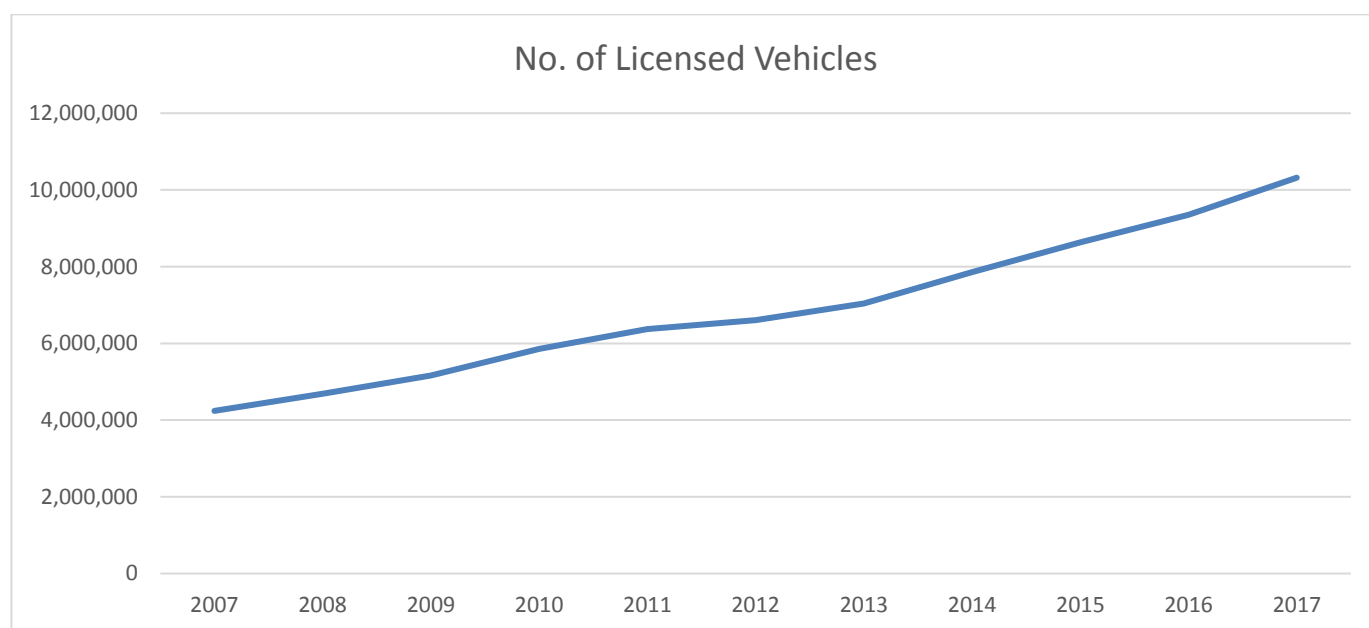


Figure 2: Population increase in Egypt



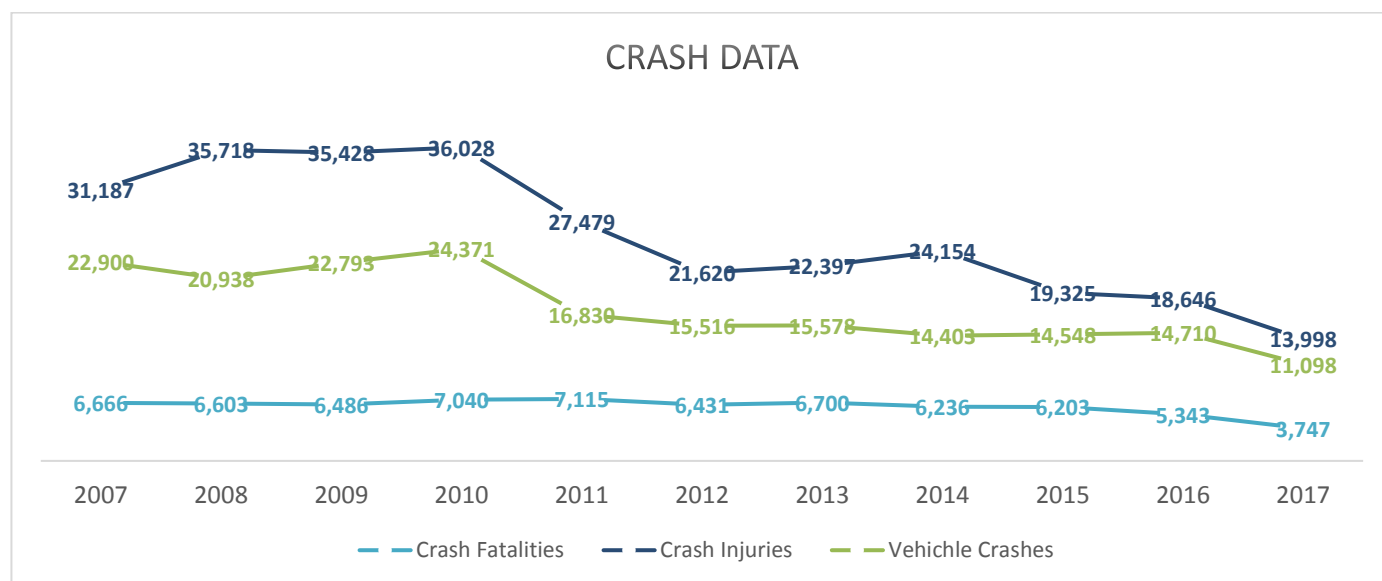
Source: World Bank, (multiple years)

Figure 3: Number of Licensed Vehicles in Egypt



Source: Author's compilation based on CAPMAS' Car & Train Accidents Bulletin (multiple years)

Figure 4: Vehicles Crashes, and Crash Fatalities and Injuries



Source: Author's compilation based on CAPMAS' Car & Train Accidents Bulletin (multiple years)

Figure 5: An out of service Traffic Light in a roundabout in New Cairo



Source: ELMoghazi (2019)

Figure 6: An out of service traffic light



Source: ELMoghazi (2019)

Figure 7: A traffic light's pole



Source: ELMoghazi (2019)

Figure 8: A part of a broken traffic light pole



Source: ELMoghazi (2019)

Figure 9: A child driving a loader on North 90 Street in New Cairo



Source: ELMoghazi (2018)

Two children around 10-12 years of age were observed playing with a heavy construction loader in broad day light. A child driver was driving it forwards and reversing it backwards in the middle lane on North 90 Street. By the time I U-turned and parked my car to document the incident they had stopped on the side to load the sidewalk's interlocks on the loader.

For Police reference this picture was taken exactly at 11:14 am, October 17, 2018 across Better Homes buildings on North 90 street, New Cairo.

Figure 10: A child drives a tricycle against the direction of traffic



Source: ELMoghazi (2018)

Figure 11: A dangerously loaded truck without license plates



Source: ELMoghazi (2018)

Figure 12: A Truck without backlights nor a license plate



Source: ELMoghazi (2018)

Figure 13: A dangerously overloaded truck



Source: ELMoghazi (2018)

Figure 14: A dangerously loaded truck without license plates



Source: ELMoghazi (2018)

Figure 15: A truck without license plates



Source: (ELMoghazi, 2018)

Figure 16: A car without license plates



Source: ELMoghazi (2018)

Figure 17: A car without license plates



Source: ELMoghazi (2018)

Figure 18: A car without license plates



Source: ELMoghazi (2018)

Figure 19: Two Motorbikes at a petrol station, one is without the license plates



Source: ELMoghazi (2019)

Figure 20: Different license plates format



Source: ELMoghazi (2018)

Figure 21: Three cars and three license plates formats



Source: ELMoghazi (2018)

Figure 22: Handwritten license plates



Source: ELMoghazi (2018)

Figure 23: A poorly handwritten license plate



Source: ELMoghazi (2018)

Figure 24: A handwritten license plate



Source: ELMoghazi (2018)

Figure 25: A car driving in the opposite direction on New Cairo- Suez Highway



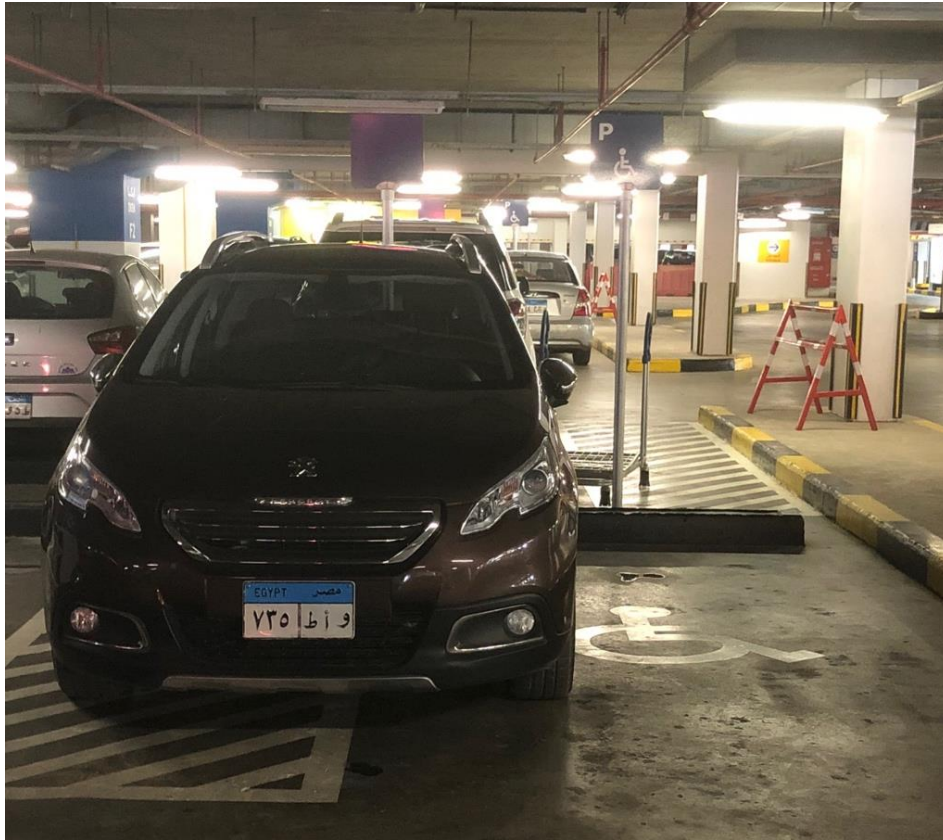
(Source: ELMoghazi (2018))

Figure 26: A parent's car parked in the middle lane across a school during pickup time (notice the mirrors)



Source: ELMoghazi (2018)

Figure 27: A car occupying the disabled parking without a visible permit



Source: ELMoghazi (2018)

Figure 28: The parking's management reserve's the disabled parking using barricades



Source: ELMoghazi (2018)

Figure 29: A Police Officer and a Police Trustee



Source: ELMoghazi (2018)

Figure 30: A pedestrian vulnerably crossing the road



Source: ELMoghazi (2018)

Figure 31: A pedestrian vulnerably crossing a bridge



Source: ELMoghazi (2018)

Figure 32: Pedestrians crossing in front of a speed hump with faded paint



Source: ELMoghazi (2018)

Figure 33: A pedestrian running to cross a wide lane street



Source: ELMoghazi (2018)

Figure 34: Across AUC the sidewalks are occupied with advertisement and light poles



Source: ELMoghazi (2018)

Figure 35: Across AUC pedestrians are unable to use the occupied sidewalk



Source: ELMoghazi (2018)

Figure 36: The wrongly used lacquer paint wears off quickly on the asphalt but not on the pavement sides where there is no friction



Source: ELMoghazi (2018)

Figure 37: The MP is trying to lift the asphalt with his barehand



Figure 38: The MP easily removed the asphalt



Figure 39: The MP holding pieces of the asphalt in his hands



Source : dmc tv (2018)

Figure 40: Paving North 90 Street in April 2018



Source: ELMoghazi (2018)

Figure 41: Road Works Machine and Truck on North 90 Street in April 2018



Source: ELMoghazi (2018)

Figure 42: North 90 Street Newly Paved in August 2018



Source: ELMoghazi (2018)

Figure 43: The Newly paved North 90 Street is being destroyed in October 2018



Source: ELMoghazi (2018)

Figure 44: Underground Pipes are beging installed and the new asphalt is destroyed in October 2018



Source: ELMoghazi (2018)

Figure 45: A closer look at the destruction of the newly paved North 90 road in October 2018



Source: ELMoghazi (2018)

Figure 46: An underground pipe with construction supports. October 2018



Source: ELMoghazi (2018)

Figure 47: More pipes were installed in October 2018 after North 90 Street in was paved. Notice the new destroyed asphalt



Source: ELMoghazi (2018)

Figure 48: Unrestrained children in the back of a pickup truck



Source: ELMoghazi (2018)

Figure 49: Unrestrained children in the back of a tricycle



Source: ELMoghazi (2018)

Figure 50: Dangerously seated children inside a car's trunk



Source: ELMoghazi (2018)

Figure 51: Three school children and a driver are on one motorcycle none of them wearing helmets



Source: ELMoghazi (2018)

Figure 52: A driver, four children and their school bags on one motorcycle



Source: ELMoghazi (2018)

Figure 53: A distracted motorcyclist driving without a helmet and looking through his phone



Source: ELMoghazi (2018)

Figure 54: Four men on one motorcycle, none of them is wearing a helmet



Source: ELMoghazi (2018)

Figure 55: A group of people are overloaded on a pickup truck



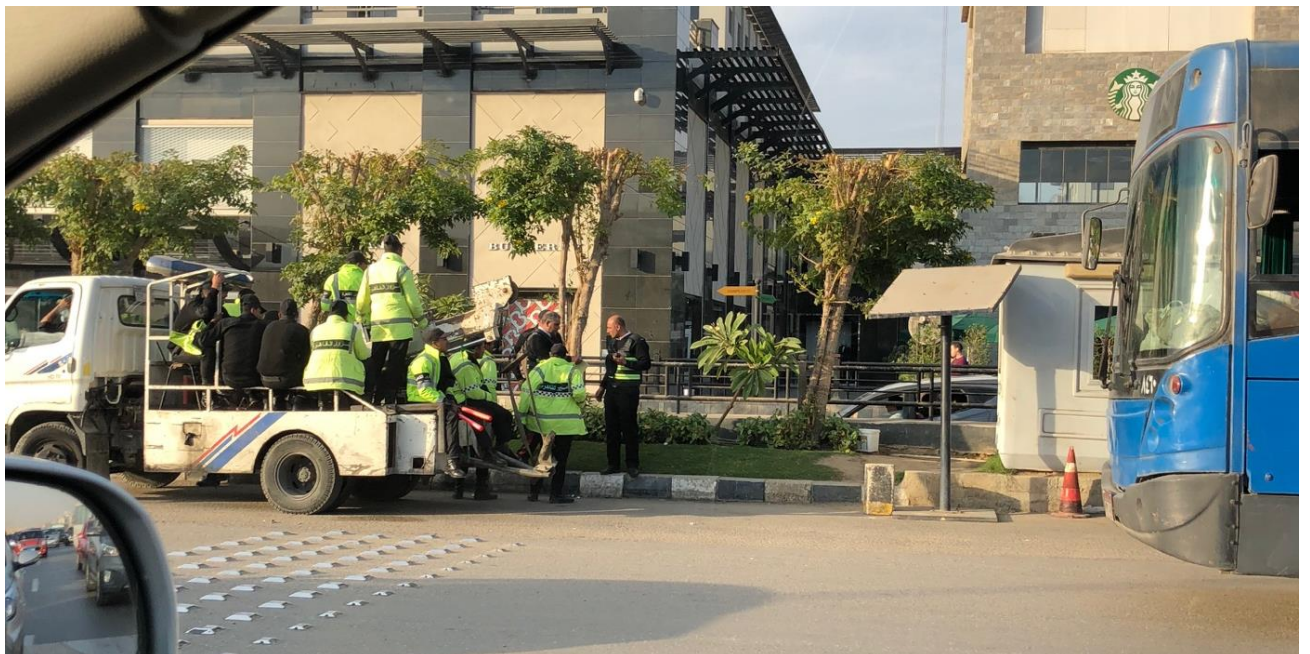
Source: ELMoghazi (2018)

Figure 56: Traffic police guards are overloaded on the back of a towing truck



Source: ELMoghazi (2018)

Figure 57: Traffic police guards are overloaded on the back of a towing truck while receiving instructions



Source: ELMoghazi (2018)

Figure 58: Jaywalkers Underneath a Pedestrian Bridge on a Highway



Source: ELMoghazi (2018)

APPENDIX B (Attachments)

- The UN's Decade of Action for Road Safety 2010-2020 Conceptual Framework:

Pillar 1: Road safety management:

Adhere to and/or fully implement UN legal instruments and encourage the creation of regional road safety instruments. Encourage the creation of multi-sectoral partnerships and designation of lead agencies with the capacity to develop and lead the delivery of national road safety strategies, plans and targets, underpinned by the data collection and evidential research to assess countermeasure design and monitor implementation and effectiveness.

Activity 1: Adhere to and/or fully implement the major United Nations road safety related agreements and conventions; and encourage the creation of new regional instruments similar to the European Agreement concerning the Work of Crews of Vehicles engaged in International Road Transport (AETR), as required, including:

- Convention on Road Traffic, of 8 November 1968, aiming at facilitating international road traffic and at increasing road safety through the adoption of uniform road traffic rules;
- Convention on Road Signs and Signals, of 8 November 1968, setting up a set of commonly agreed road signs and signals;
- AETR, of 1 July 1970, to be used as a model the creation of regional legal instruments.

Activity 2: Establish a lead agency (and associated coordination mechanisms) on road safety involving partners from a range of sectors through:

- designating a lead agency and establishing related secretariat;
- encouraging the establishment of coordination groups; and
- developing core work programs.

Activity 3: Develop a national strategy (at a cabinet or ministerial level) coordinated by the lead agency through:

- confirming long-term investment priorities;
- specifying agency responsibilities and accountabilities for development and implementation of core work programs;
- identifying implementation projects;
- building partnership coalitions;
- promoting road safety management initiatives such as the new ISO traffic safety management standard ISO 39001; and
- establishing and maintaining the data collection systems necessary to provide baseline data and monitor progress in reducing road traffic injuries and fatalities and other important indicators such as cost, etc.

Activity 4: Set realistic and long-term targets for national activities based on the analysis of national traffic crash data through:

- identifying areas for performance improvements; and
- estimating potential performance gains.

Activity 5: Work to ensure that funding is sufficient for activities to be implemented through:

- building business cases for sustained funding based on the costs and benefits of proven investment performance;
- recommending core annual and medium-term budgetary targets;
- encouraging the establishment of procedures for the efficient and effective allocation of resources across safety programs;
- utilizing 10% of infrastructure investments for road safety; and
- identifying and implementing innovative funding mechanisms.

Activity 6: Establish and support data systems for on-going monitoring and evaluation to include a number of process and outcome measures, including:

- establishing and supporting national and local systems to measure and monitor road traffic deaths, injuries and crashes;
- establishing and supporting national and local systems to measure and monitor intermediate outcomes, such as average speed, helmet-wearing rates, seat-belt wearing rates, etc.;
- establishing and supporting national and local systems to measure and monitor outputs of road safety interventions;
- establishing and supporting national and local systems to measure and monitor the economic impact of road traffic injuries; and
- establishing and supporting national and local systems to measure and monitor exposure to road traffic injuries.

Pillar 2: Safer roads and mobility

Raise the inherent safety and protective quality of road networks for the benefit of all road users, especially the most vulnerable (e.g. pedestrians, bicyclists and motorcyclists). This will be achieved through the implementation of various road infrastructure agreements under the UN framework, road infrastructure assessment and improved safety-conscious planning, design, construction and operation of roads.

Activity 1: Promote road safety ownership and accountability among road authorities, road engineers and urban planners by:

- encouraging governments and road authorities to set a target to “eliminate high risk roads by 2020”;
- encouraging road authorities to commit a minimum of 10% of road budgets to dedicated safer road infrastructure programs;
- making road authorities legally responsible for improving road safety on their networks through cost-effective measures and for reporting annually on the safety situation, trends and remedial work undertaken;
- establishing a specialist road safety or traffic unit to monitor and improve the safety of the road network;
- promoting the safe system approach and the role of self-explaining and forgiving road infrastructure;
- Adhere to and/or fully implement the regional road infrastructure Agreements developed under the auspices of the United Nations regional commissions and encourage the creation of similar regional instruments, as required; and
- monitoring the safety performance of investments in road infrastructure by national road authorities, development banks and other agencies.

Activity 2: Promoting the needs of all road users as part of sustainable urban planning, transport demand management and land-use management by:

- planning land use to respond to the safe mobility needs of all, including travel demand management, access needs, market requirements, geographic and demographic conditions;
- including safety impact assessments as part of all planning and development decisions; and
- putting effective access and development control procedures in place to prevent unsafe developments.

Activity 3: Promote safe operation, maintenance and improvement of existing road infrastructure by requiring road authorities to:

- identify the number and location of deaths and injuries by road user type, and the key infrastructure factors that influence risk for each user group;
- identify hazardous road locations or sections where excessive numbers or severity of crashes occur and take corrective measures accordingly;
- conduct safety assessments of existing road infrastructure and implement proven engineering treatments to improve safety performance;
- take a leadership role in relation to speed management and speed sensitive design and operation of the road network; and ensure work zone safety.

Activity 4: Promote the development of safe new infrastructure that meets the mobility and access needs of all users by encouraging relevant authorities to:

- take into consideration all modes of transport when building new infrastructure;
- set minimum safety ratings for new designs and road investments that ensure the safety needs of all road users are included in the specification of new projects;
- use independent road safety impact assessment and safety audit findings in the planning, design, construction, operation and maintenance of new road projects, and ensure the audit recommendations are duly implemented.

Activity 5: Encourage capacity building and knowledge transfer in safe infrastructure by:

- creating partnerships with development banks, national authorities, civil society, education providers and the private sector to ensure safe infrastructure design principles are well understood and applied;
- promoting road safety training and education in low-cost safety engineering, safety auditing and road assessment; and
- developing and promoting standards for safe road design and operation that recognize and integrate with human factors and vehicle design.

Activity 6: Encourage research and development in safer roads and mobility by:

- completing and sharing research on the business case for safer road infrastructure and the investment levels needed to meet the Decade of Action targets;
- promoting research and development into infrastructure safety improvements for road networks in low-income and middle-income countries; and
- promoting demonstration projects to evaluate safety improvement innovations, especially for vulnerable road users.

Pillar 3: Safer vehicles

Encourage universal deployment of improved vehicle safety technologies for both passive and active safety through a combination of harmonization of relevant global standards, consumer information schemes and incentives to accelerate the uptake of new technologies.

Activity 1: Encourage Member States to apply and promulgate motor vehicle safety regulations as developed by the United Nation's World Forum for the Harmonization of Vehicle Regulations (WP 29).

Activity 2: Encourage implementation of new car assessment programs in all regions of the world in order to increase the availability of consumer information about the safety performance of motor vehicles.

Activity 3: Encourage agreement to ensure that all new motor vehicles are equipped with seat-belts and anchorages that meet regulatory requirements and pass applicable crash test standards (as minimum safety features).

Activity 4: Encourage universal deployment of crash avoidance technologies with proven effectiveness such as Electronic Stability Control and Anti-Lock Braking Systems in motor vehicles.

Activity 5: Encourage the use of fiscal and other incentives for motor vehicles that provide high levels of road user protection and discourage import and export of new or used cars that have reduced safety standards.

Activity 6: Encourage application of pedestrian protection regulations and increased research into safety technologies designed to reduce risks to vulnerable road users.

Activity 7: Encourage managers of governments and private sector fleets to purchase, operate and maintain vehicles that offer advanced safety technologies and high levels of occupant protection.

Pillar 4: Safer road users

Develop comprehensive programs to improve road user behavior. Sustained or increased enforcement of laws and standards, combined with public awareness/education to increase seat-belt and helmet wearing rates, and to reduce drink-driving, speed and other risk factors.

Activity 1: Increase awareness of road safety risk factors and prevention measures and implement social marketing campaigns to help influence attitudes and opinions on the need for road safety programs.

Activity 2: Set and seek compliance with speed limits and evidence-based standards and rules to reduce speed-related crashes and injuries.

Activity 3: Set and seek compliance with drink-driving laws and evidence-based standards and rules to reduce alcohol-related crashes and injuries.

Activity 4: Set and seek compliance with laws and evidence-based standards and rules for motorcycle helmets to reduce head-injuries.

Activity 5: Set and seek compliance with laws and evidence-based standards and rules for seat-belts and child restraints to reduce crash injuries.

Activity 6: Set and seek compliance with transport, occupational health and safety laws, standards and rules for safe operation of commercial freight and transport vehicles, passenger road transport services and other public and private vehicle fleets to reduce crash injuries.

Activity 7: Research, develop and promote comprehensive policies and practices to reduce work-related road traffic injuries in the public, private and informal sectors, in support of internationally recognized standards for road safety management systems and occupational health and safety.

Activity 8: Promote establishment of Graduated Driver Licensing systems for novice drivers.

Pillar 5: Post crash response

Increase responsiveness to post-crash emergencies and improve the ability of health and other systems to provide appropriate emergency treatment and longer-term rehabilitation for crash victims.

Activity 1: Develop prehospital care systems, including the extraction of a victim from a vehicle after a crash, and implementation of a single nationwide telephone number for emergencies, through the implementation of existing good practices.

Activity 2: Develop hospital trauma care systems and evaluate the quality of care through the implementation of good practices on trauma care systems and quality assurance.

Activity 3: Provide early rehabilitation and support to injured patients and those bereaved by road traffic crashes, to minimize both physical and psychological trauma.

Activity 4: Encourage the establishment of appropriate road user insurance schemes to finance rehabilitation services for crash victims through:

- Introduction of mandatory third-party liability; and
- International mutual recognition of insurance, e.g. green card system.

Activity 5: Encourage a thorough investigation into the crash and the application of an effective legal response to road deaths and injuries and therefore encourage fair settlements and justice for the bereaved and injuries.

Activity 6: Provide encouragement and incentives for employers to hire and retain people with disabilities.

Activity 7: Encourage research and development into improving post-crash response.

- Egypt's Data: The Global Status Report on Road Safety 2015

EGYPT

Population: 82 056 378 • Income group: Middle • Gross national income per capita: US\$ 3 140



INSTITUTIONAL FRAMEWORK

Lead agency	National Council for Road Safety
Funded in national budget	No
National road safety strategy	Yes
Funding to implement strategy	Not funded
Fatality reduction target	5% annually (2011–2020)

SAFER ROADS AND MOBILITY

Formal audits required for new road construction projects	Yes
Regular inspections of existing road infrastructure	Yes
Policies to promote walking or cycling	No
Policies to encourage investment in public transport	No
Policies to separate road users and protect VRUs	No

SAFER VEHICLES

Total registered vehicles for 2013	7 037 954
Cars and 4-wheeled light vehicles	3 851 916
Motorized 2- and 3-wheelers	1 888 140
Heavy trucks	1 054 175
Buses	104 013
Other	139 710
Vehicle standards applied ^a	
Frontal impact standard	Yes
Electronic stability control	Yes
Pedestrian protection	Yes

^a UNECE WP29.

POST-CRASH CARE

Emergency room injury surveillance system	Yes
Emergency access telephone numbers	123
Permanently disabled due to road traffic crash	—

DATA

Reported road traffic fatalities (2013)	6 700 ^b (83% M, 17% F)
WHO estimated road traffic fatalities	10 466
WHO estimated rate per 100 000 population	12.8
Estimated GDP lost due to road traffic crashes	—

^b Central Agency for Public Mobilization and Statistics. Defined as died at scene of crash.

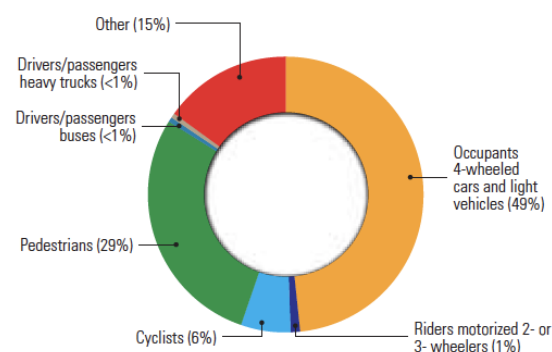
SAFER ROAD USERS

National speed limit law	Yes
Max urban speed limit	60 km/h
Max rural speed limit	90 km/h
Max motorway speed limit	100 km/h
Local authorities can modify limits	Yes
Enforcement	0 1 2 3 4 5 6 7 8 9 10
National drink-driving law	Yes ^c
BAC limit – general population	—
BAC limit – young or novice drivers	—
Random breath testing carried out	Yes
Enforcement	0 1 2 3 4 5 6 7 8 9 10
% road traffic deaths involving alcohol	—
National motorcycle helmet law	Yes
Applies to drivers and passengers	Yes
Law requires helmet to be fastened	No
Law refers to helmet standard	No
Enforcement	0 1 2 3 4 5 6 7 8 9 10
Helmet wearing rate	—
National seat-belt law	Yes
Applies to front and rear seat occupants	No
Enforcement	0 1 2 3 4 5 6 7 8 9 10
Seat-belt wearing rate	14%–19% Drivers ^d , 3%–4% Front seats ^d
National child restraint law	No
Restrictions on children sitting in front seat	Yes
Child restraint law based on	—
Enforcement	—
% children using child restraints	—
National law on mobile phone use while driving	Yes
Law prohibits hand-held mobile phone use	Yes
Law also applies to hands-free phones	No
National drug-driving law	Yes

^c Not based on BAC.

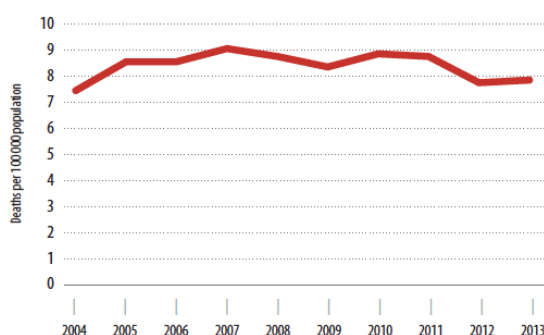
^d 2011–2012, Risk factors for Road Traffic Injuries in Egypt: Findings from Two Cities (range reflects different principal roads).

DEATHS BY ROAD USER CATEGORY



Source: Health Directorate, Health Officers, Death Certificates (data from 2013).

TRENDS IN REPORTED ROAD TRAFFIC DEATHS



Source: Central Agency for Public Mobilization and Statistics.

Legislative review conducted by WHO. Vehicle safety law from UNECE WP29. Other data collected by questionnaire and cleared by General Authority for Roads, Bridges and Land Transport (GARBL).

• Egypt's Data: The Global Status Report on Road Safety 2009

DISCLAIMER: THIS STUDY DISAPPROVES THE FOLLOWING MAP OF EGYPT BECAUSE EGYPT'S MAP INCLUDE HALAYB AND SHALATEEN WHICH ARE PART OF THE EGYPTIAN TERRITORIES AND SOVEREIGNTY.

EGYPT

Population: **75 497 913**

Income group: **Middle**

Gross national income per capita: **\$1 580**



INSTITUTIONAL FRAMEWORK	
Lead agency	National Council for Road Safety
Funded in national budget	Yes
National road safety strategy	Yes
Measurable targets	No
Funded	No

NATIONAL LEGISLATION	
Speed limits set nationally	Yes
Local authorities can set lower limits	No
Maximum limit urban roads	60 km/h
Enforcement ^a	0 1 2 3 4 5 6 7 8 9 10
Drink-driving law	Yes
BAC limit – general population	None ^b
BAC limit – young or novice drivers	None ^b
Random breath testing and/or police checkpoints	No
Road traffic deaths involving alcohol	—
Enforcement ^a	0 1 2 3 4 5 6 7 8 9 10
Motorcycle helmet law	Yes
Applies to all riders	No
Helmet standards mandated	No
Helmet wearing rate	70% Passengers ^c
Enforcement ^a	0 1 2 3 4 5 6 7 8 9 10
Seat-belt law	Yes
Applies to all occupants	No
Seat-belt wearing rate	70% Drivers ^c
Enforcement ^a	0 1 2 3 4 5 6 7 8 9 10
Child restraints law	No
Enforcement ^a	n/a

^a Enforcement score represents consensus based on professional opinion of respondents, on a scale of 0 to 10 where 0 is not effective and 10 is highly effective.

^b Drink-driving not defined by BAC limit.

^c 2003, Ministry of Interior.

VEHICLE STANDARDS	
Car manufacturers required to adhere to standards on	
Fuel consumption	No
Seat-belt installation for all seats	No
ROAD SAFETY AUDITS	
Formal audits required for major new road construction projects	Yes
Regular audits of existing road infrastructure	Yes
PROMOTING ALTERNATIVE TRANSPORT	
National policies to promote walking or cycling	No
National policies to promote public transportation	Yes

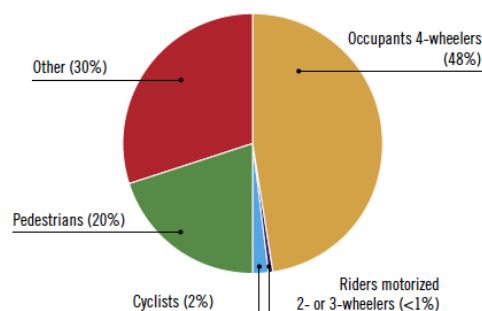
POST-CRASH CARE	
Formal, publicly available pre-hospital care system	Yes
National universal access number	Yes

— Data not available.
n/a Data not required/not applicable.

DATA
Reported road traffic fatalities (2007)
12 295 ^d (70% males, 30% females)
Reported non-fatal road traffic injuries (2007)
154 000 ^e
Costing study available
No

^d Health data, defined as died at the crash scene.
^e 2007, Health data.

DEATHS BY ROAD USER CATEGORY



Source: 2005, National Information Center for Health & Population

TRENDS IN ROAD TRAFFIC DEATHS



REGISTERED VEHICLES	
4 300 000 total (2008)	
Motorcars	60%
Motorized 2- and 3-wheelers	19%
Trucks	18%
Buses	2%
Other	1%

Data cleared by the Ministry of Health and Population.

- Articles from the Egyptian law

تنص المادة ٢٣٨ من قانون العقوبات بالآتي:

من تسبب خطأ في موت شخص آخر بان كان ذلك ناشئاً عن اهماله او رعوثته او عدم احترازه او عدم مراعاته للقوانين والقرارات . واللوائح والانظمة يعاقب بالحبس مدة لا تقل عن ستة اشهر وبغرامة لا تجاوز مائتي جنيه او بإحدى هاتين العقوبتين وتكون العقوبة الحبس مدة لا تقل عن سنة ولا تزيد على خمس سنين وغرامة لا تقل عن مائة ولا تجاوز خمسمائة جنيه او بإحدى هاتين العقوبتين اذا وقعت الجريمة نتيجة اخلال الجاني اخلاقاً جسيماً بما تفرضه عليه اصول وظيفته او مهنته او حرفته او كان متعاطياً مسكراً او مخدراً عند ارتكابه الخطأ الذي نجم عنه الحادث او نكل وقت الحادث عن مساعدة من وقعت عليه الجريمة او عن طلب المساعدة له مع تمكنه من ذلك وتكون العقوبة الحبس مدة لا تقل عن سنة ولا تزيد على سبع سنين اذا نشأ عن الفعل وفاة اكثر من ثلاثة اشخاص فاذا توافر ظرف اخر من الظروف الواردة في الفقرة السابقة كانت العقوبة بالحبس مدة لا تقل عن سنة ولا تزيد على عشر سنين

Translation of Article 238 of the Penal Code reads as follows:

Whoever caused a mistake in the death of another person if that was due to negligence or incompetence or lack of care or not to comply with laws, decrees, regulations and regulations shall be punished by imprisonment for a period of not less than six months and a fine not exceeding two hundred pounds or one of these penalties.

The penalty shall be imprisonment for a period of not less than one year and not more than five years and a fine not less than one hundred pounds and not exceeding five hundred pounds or one of these two penalties if the crime is committed as a result of a serious breach of the duty imposed by the offender on the basis of the job mandate or profession or craft or if the perpetrator was under the influence of alcohol or drugs when the mistake happened which has resulted in an accident or if the preparator did not provide assistance while they can to the victims at the time of the accident.

The penalty shall be imprisonment for a period of not less than one year and not more than seven years if the act results in the death of more than three persons. If there is another circumstance mentioned in the preceding paragraph were satisfied, the penalty shall be imprisonment for a period of not less than one year and not exceeding ten years.

كما تجرى المادة ٢٤٤ من قانون العقوبات بالآتي:

من تسبب خطأ في جرح شخص او اذيائه بان كان ذلك ناشئاً عن اهماله او رعوثته او عدم احترازه او عدم مراعاته للقوانين والقرارات واللوائح والانظمة يعاقب بالحبس مدة لا تزيد على سنة وبغرامة "لا تجاوز مائتي جنيه" او بإحدى هاتين العقوبتين وتكون العقوبة الحبس مدة لا تزيد على سنتين وغرامة لا تجاوز ثلاثمائة جنيه او احدى هاتين العقوبتين اذا نشأ عن الاصابة عاهة مستديمة او اذا وقعت الجريمة نتيجة اخلال الجاني اخلاقاً جسيماً بما تفرضه عليه اصول وظيفته او مهنته او حرفته او كان متعاطياً مسكراً او مخدراً عند ارتكابه الخطأ الذي نجم عنه الحادث او نكل وقت الحادث عن مساعدة من وقعت عليه الجريمة او عن طلب المساعدة له مع تمكنه من ذلك وتكون العقوبة الحبس اذا نشأ عن الجريمة اصابة اكثر من ثلاثة اشخاص ، فاذا توافر ظرف اخر من الظروف الواردة في الفقرة السابقة تكون العقوبة الحبس مدة لا تقل عن سنة ولا تزيد على خمس سنين

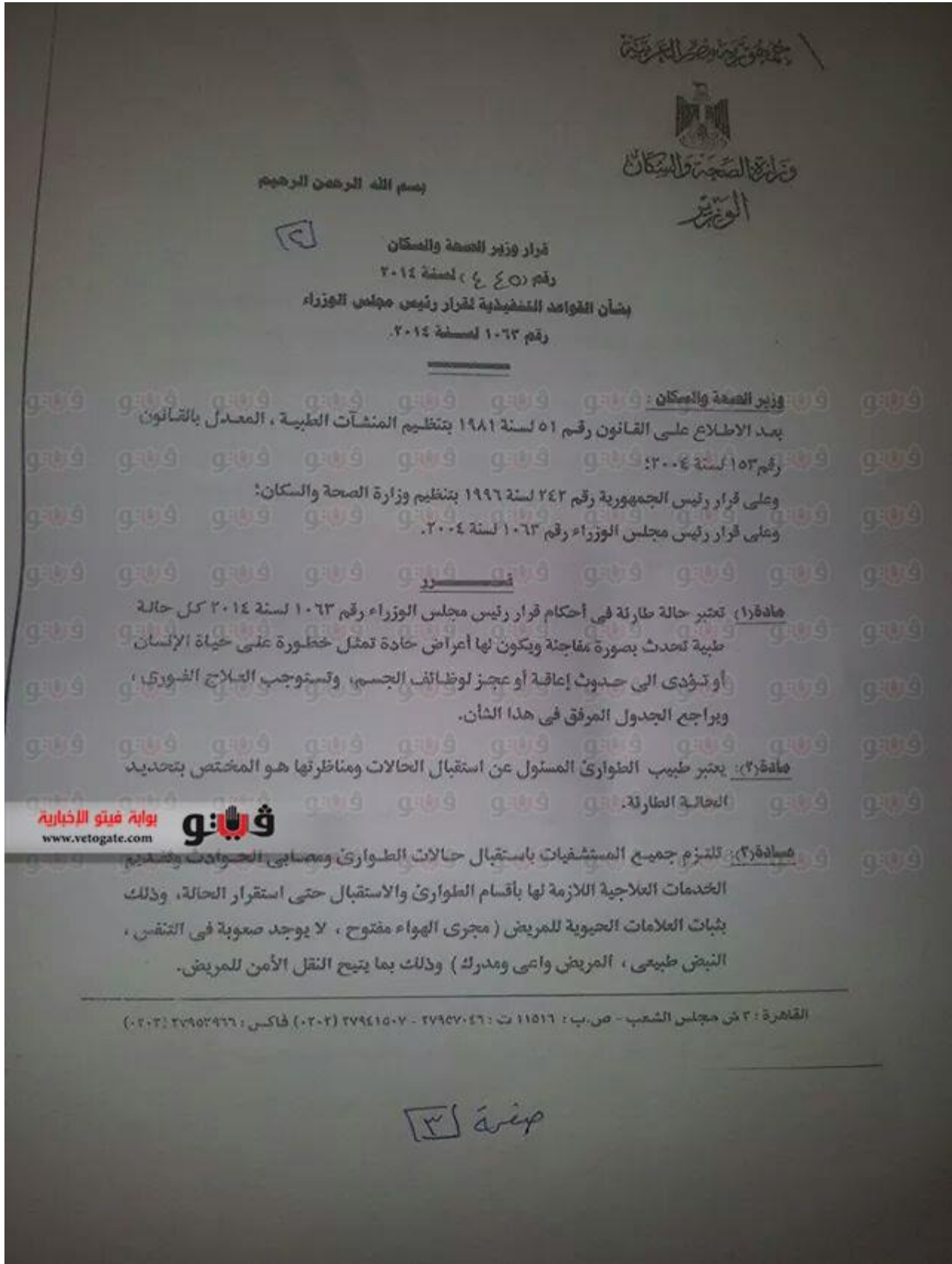
Translation of Article 244 of the Penal Code reads as follows:

Whoever caused a mistake in injuring a person or injuring him if that was due to negligence, recklessness, lack of care or failure to comply with the laws, decrees, rules and regulations shall be liable to imprisonment for a period not exceeding one year and a fine not exceeding two hundred pounds.

The penalty shall be imprisonment for a period of not more than two years and a fine not exceeding three hundred pounds or one of these penalties if the injury results in permanent disability or if the crime occurred as a result of serious breach of duty by the offender as imposed by his job mandate or profession or his craft or was drunk or drugged when they committed the error which resulted in the incident or did not at the time of the incident help those the crime were committed against given that the preparator had the ability to help.

The penalty shall be imprisonment if the crime results in the injury of more than three persons. If there is another circumstance in the preceding paragraph, the penalty shall be imprisonment for not less than one year and not more than five years

- The Contents of the 48 hours emergency law has been translated from the following official document which was issued in 2014 by the Egyptian Prime Minister:





وفي كل الأحوال لا بد من تقديم العلاج اللازم لمصاب الطوارئ بقسم الطوارئ ثم ينقل إلى القسم الداخلي في حالة عدم استقرار حالته وبحد أقصى ٤٨ ساعة ، ثم يعاد تقييم حالته ويخير المريض أو ذويه بين البقاء داخل المستشفى على نفقته الخاصة بالأجور المعلن عنها أو النقل الآمن لأقرب مستشفى حكومي.

مادة (٤) : تلزم سيارات الإسعاف بنقل الحالات الطارئة إلى أقرب مستشفى حكومي داخل النطاق الجغرافي (محيط خمسة كيلو متر) للحادث أو الحالات الطارئة أولاً ، وفي حال عدم توفر مستشفى حكومي داخل هذا النطاق يتم التوجه إلى أقرب مستشفى لتلقي الخدمة اللازمة .

مادة (٥) : في حالة اختيار المريض أو ذويه مستشفى بعينه لا تقع داخل النطاق الجغرافي المحدد بالمادة السابقة مع وجود مستشفى حكومي تقدم الخدمة المطلوبة داخل هذا النطاق يتحمل المريض تكاليف العلاج بقسم الطوارئ بالمستشفى المطلوبة من ماله الخاص .

مادة (٦) : تتحمل الإدارة العامة للمجالس الطبية المتخصصة (العلاج على نفقة الدولة) تكلفة

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فيتو

علاج مصابي ومرضى الطوارئ خلال الثمانية وأربعين ساعة ، بالنسبة لغير الخاضعين لنظام التأمين الصحي العام أو أي نظام تأميني آخر ، بما في ذلك مشروعات علاج العاملين بالقطاعات أو الهيئات أو الشركات أو المؤسسات أو ما يماثلها طبقاً لبروتوكولات ولوائح العلاج المبرمة في هذا الشأن

جمهورية مصر العربية



وزارة الصحة والسكان

الوزير

- ٢ -

وبالنسبة للخاضعين لنظام التأمين الصحي العام أو أى نظام تأمينى صحى خاص ، بما فى ذلك مشروعات علاج العاملين بالتقايات أو الهيئات أو الشركات أو المؤسسات أو ما يماثلها ، تتحمل الجهة الخاضعين لها تكاليف علاج مصابى ومرضى الطوارئ خلال الثمانية وأربعين ساعة المذكورة وذلك طبقا للقواعد المعمول بها ببروتوكولات ولوائح العلاج المبرمة فى هذا الشأن .

مادة (٧) : تلتزم جميع المستشفيات المقدمة للخدمات العلاجية بتقديم كافة المستندات الدالة على تقديم تلك الخدمات لمصابى ومرضى الطوارئ طبقا للوائح والقوانين التى تحددها الجهة التى تتحمل نفقات العلاج (التأمين الصحى ، العلاج على نفقة الدولة ، مشروعات العلاج والرعاية وغيرها) .

مادة (٨) : تلتزم جميع المستشفيات التى تقوم باستقبال الحالات الطارئة بإبلاغ غرفة الطوارئ المركزية (على رقم ١٢٧) فى غضون ست ساعات من استقبال الحالة .

مادة (٩) : فى جميع الأحوال تلتزم جميع المستشفيات بعدم تحويل الحالات إلا بعد التنسيق مع غرفة الطوارئ المركزية والإقليمية أو غيرهما بتوافر المكان المناسب لحالة المريض أو المصاب الصحية وذلك بعد تقديم الخدمة العلاجية الطارئة واللازمة لاستقرار حياة المريض .

مادة (١٠) : فى حالة عدم الالتزام بالأحكام الواردة بقرار رئيس مجلس الوزراء رقم ١٠٦٣ لسنة ٢٠١٤ ، أو بأحكام هذا القرار ، يعاقب المخالف طبقا للمخالفات الواردة فى القانون رقم ٥١ لسنة ١٩٨١ ، سالف الذكر .

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وزير الصحة والسكان
د. عادل مدوى

فى ٢٠١٤/٧/٢٦

القاهرة ٢١ ش مجلس الشعب - ص.ب : ١١٥١٦ ت : ٢٧٩٥٧٠٤٦ - ٢٧٩٤١٥٠٧ (٢٠٢) فاكس : ٢٧٥٢٩٦٦ (٢٠٢)

صفحة ١٥